

In This Issue—*The Field of Ford Service*

MOTOR AGE

Vol. XLV
Number 9

PUBLISHED WEEKLY AT THE MALLERS BUILDING
CHICAGO, FEBRUARY 28, 1924

Thirty-five Cents a Copy
Three Dollars a Year



**No. 5
for
Buick**

Dealers render a real service to their customers in recommending the replacement of spark plugs by the full set.

**Champion Spark Plug Company
Toledo, Ohio**

Champion Spark Plug Company of Canada, Limited
Windsor, Ontario



CHAMPION

Dependable for Every Engine



WHY NEW SPARK PLUGS ONCE A YEAR

Many do not understand how new spark plugs improve the running of the motor. The reasons are perfectly simple and easily understood.

The spark plugs must furnish from 600 to 1500 full, intense, perfectly timed, sparks a minute while continuously subjected to the terrific, fiery heat of the explosions, to the splashing of the hot oil, and to the hammerlike blows of the compression.

Deposits of soot, carbon and iron are gradually burned into the surface of the insulator core, causing surface leakage of current; corrosion gradually sets up an electrical resistance in the electrodes;—with the result—a less intense spark at the points of the plug.

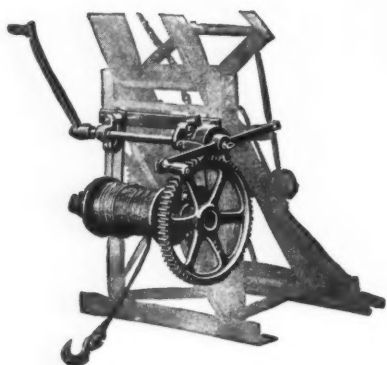
Imperfect combustion follows, only a part of the gas is actually burned and converted into power; much of it passes out the exhaust, just wasted, and still more passes by the pistons and rings down into the crank case, thins out the oil and seriously interferes with proper lubrication. Proper adjustment of the carburetor is impossible. Condition may be compared with running with retarded spark and too rich a mixture,—sluggish, poor acceleration, lack of power, lack of speed. This process is so slow that it is hardly noticeable.

Champion Spark Plugs give satisfactory service for a longer period than ordinary spark plugs, but deterioration does take place, tho not so pronounced in Champions as in others.

A new set of Champions once a year will insure:—

More acceleration	Quicker Starting
More power	Better Climbing
More speed	More Satisfaction
New Plugs soon pay for themselves in saving of gas and oil	

Get a Manley



This MANLEY Auxiliary Winch may be applied to all new style Manley Cranes. Just drill a couple of holes and attach with bolts. Drum holds 200 ft. of wire cable. Standard equipment 100 ft. Equipped with this Winch, the distance of a wreck from the road makes little difference. You drag it in, quickly and easily. Sells for \$65.



—with the SWIVEL NOSE and the auxiliary WINCH

In line with the MANLEY policy of giving the buyer more than he can get somewhere else, we are now offering Manley Wrecking Cranes Nos. 101 and 102 EQUIPPED WITH A SWIVEL NOSE—the greatest single improvement that has appeared in a year. (This Swivel Nose can be readily attached to your present Manley Crane—no holes to drill; just bolt in place).

This Swivel prevents the chain running off the sheaves—regardless of the angle of the pull. Friction is cut down—and you GET the wreck, whatever its size or position.

Note that we are now using TRIPLE Chain—to take care of the increased lifting power (2½ tons) made possible by the double truss rods.

SIX LEVERAGES—Six speeds. Two more than formerly. Chain can be used single, double or triple. And TWO Handles, permitting two men to work, if ever necessary.

The whole beam TILTS—as it MUST for proper results. Equal strength in any position. Puts very little strain on the chassis—the Self-Contained Saddle sees to this.

Changed into a portable Floor Crane in a few minutes—two cranes in one. Seven thousand Manley Cranes in daily use—you take no chance. Three sizes—2, 2½ and 5 tons. Priced \$95 up.

"HOW TO CASH IN ON A MANLEY CRANE" and Crane Bulletins mailed to any address. Buy from your jobber.

The Manley Mfg. Co., York, Pa.



One of the first methods of selling Lyon Spring Bumpers was to run a car protected by them into a stone wall or a telephone pole. Did it sell bumpers? To-day there are more than a million Lyon Spring Bumpers in use.

\$200⁰⁰

for the best letters telling
**What is your pet method of selling
 LYON SPRING BUMPERS?**

**\$200.00 in cash
 21 Prizes**

1st prize	\$50.00
2nd prize.....	25.00
3rd prize.....	15.00
4th to 7th prize.....	10.00
8th to 21st prize.....	5.00

Contest closes April 20th. Winners' names will be announced in this publication as soon after as possible. The judges will be the advertising executives of Metal Stamping Co.

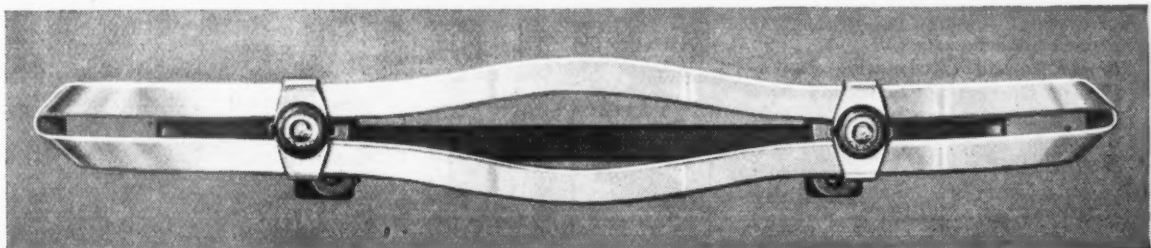
A CHANCE to make \$50.00 quicker than you ever made it before. Or to win any of the other twenty cash prizes. Write us a letter telling how you push your Lyon Bumper sales. What special display, what demonstration, what sales argument you use that hits a prospect where he lives and makes a customer out of him.

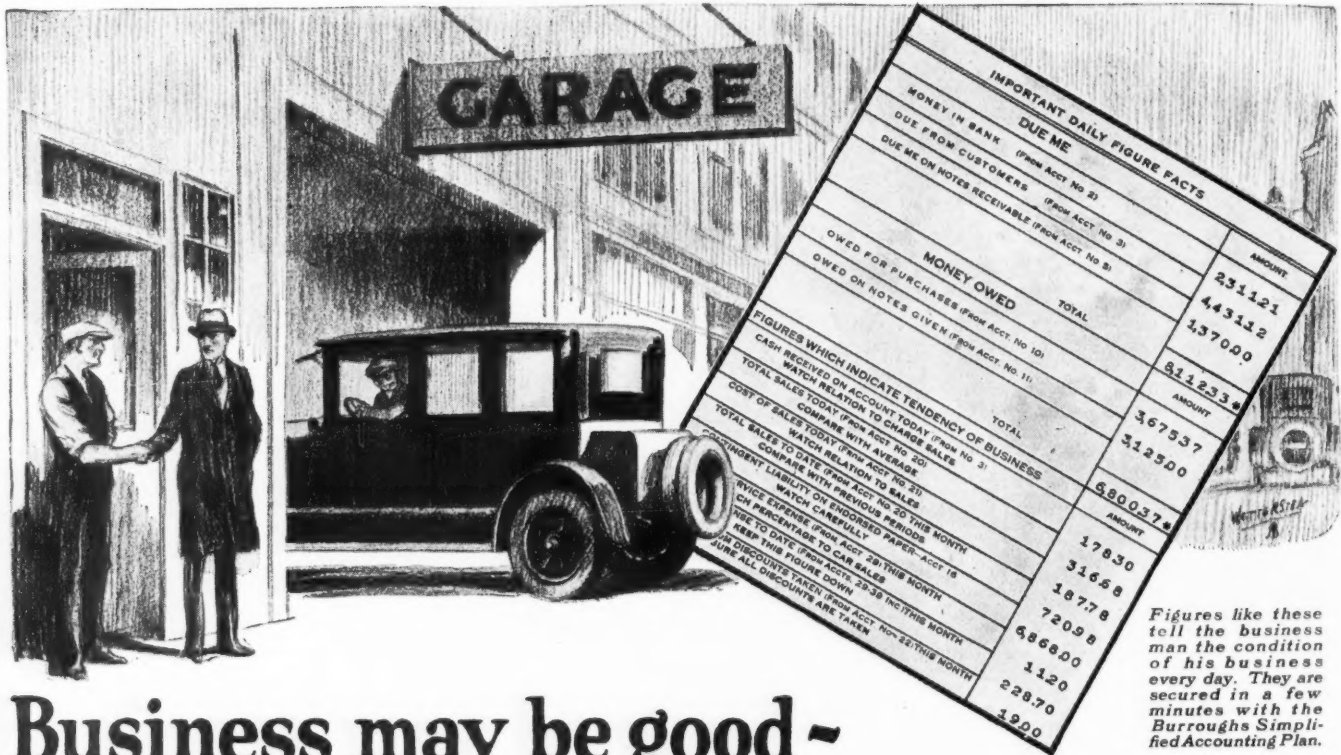
Why push Lyon Spring Bumpers when they sell so well anyway? Because the profit on each sale is four or five times that on most accessories. Because Lyon Bumpers lead the field in looks, protection and price—giving them undeniable preference with consumers.

And now! The motor world has pronounced the new Lyon End-Fold Parallel Bumper the greatest forward step in bumper construction, the fashion leader in looks, the bumper of the year. Now comes the Lyon End-Fold De Luxe—possessing all the unique features of the parallel model, with the advantage of greatly widened bumping surface. A new idea! The trade always looks to Lyon for new ideas!

Tell us how you take advantage of Lyon leadership. Write us that prize-winning sales idea of yours. Make it short and clear. But tell the whole story. Get your letter in early. Contest closes April 20th.

METAL STAMPING COMPANY, Long Island City, New York
 Canadian Licensee, B. J. Coghlin Co., Ltd., Montreal





Business may be good - but - How about the Profits?

You men in the automotive business know full well that increased business does not always mean increased profits. In some instances you have found that the larger the volume of business the smaller the profits were when the books were balanced at the end of the year.

Why wait until the end of the year to see how you stand? With figures like those in the form above—available every day—you can determine the exact condition of your business each day.

And it's so easy to have profit-making and business-building figures every day with the Burroughs Simplified Accounting Plan for garages. "We find that this system provides us with information about our business which is absolutely necessary to its proper and profitable conduct" writes the Weihaup-Savage Company, Inc., automotive dealers of La Crosse, Wis. "We know at all times just what we are doing and at the end of each month we are able to get a complete profit and loss statement by departments. The operation of the system is very simple and the assurance of accuracy, which the machine gives us, is well worth its cost."

Thousands of garage owners are using and endorsing this system. You, too, will find it a profitable investment.

Without any obligation whatsoever, the local Burroughs representative (your banker or phone book will give you his address) will gladly explain how this simple plan can build your business and increase your profits. Call him today—or mail the coupon and we will send complete information.

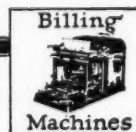
Burroughs
Adding
Machine Co.
6132 Second Blvd.
Detroit, Michigan

Please explain how the Burroughs Simplified Accounting Plan for Garages will enable me to make more money.

Name _____

Address _____

Burroughs



MOTOR AGE

Reg. U. S. Pat. Off.

Published Every Thursday by

THE CLASS JOURNAL COMPANY

5 So. Wabash Ave.
Chicago, Ills., U. S. A.

Vol. XLV

Chicago, February 28

No. 9

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SUBSCRIPTION RATES	
United States, Mexico and U. S. Possessions.....	\$ 3.00 per year
Canada.....	5.00 per year
All Other Countries in Postal Union.....	6.00 per year
Single Copies.....	35 cents

Subscriptions accepted only from the Automotive Trade
Entered as Second Class Matter Sept. 19, 1899, at the Post Office
at Chicago, Ill., under Act of March 6, 1879.

Smoothing the Way for Cooperation

How much more effectively you can work with someone who has confidence in you. We value letters like the following very highly, for they typify the spirit of trust and personal friendliness that exists between thousands of Goodrich dealers and ourselves—

"We just finished a check on our month's business and it brought to my mind what a wonderful institution is the House of Goodrich.

Our advice to anyone venturing into the tire business is to consult Goodrich. With this line you can make a sale and feel that you have made a friend."

SHOVELTON GARAGE,
Fall River, Mass.

Build with Goodrich for permanency

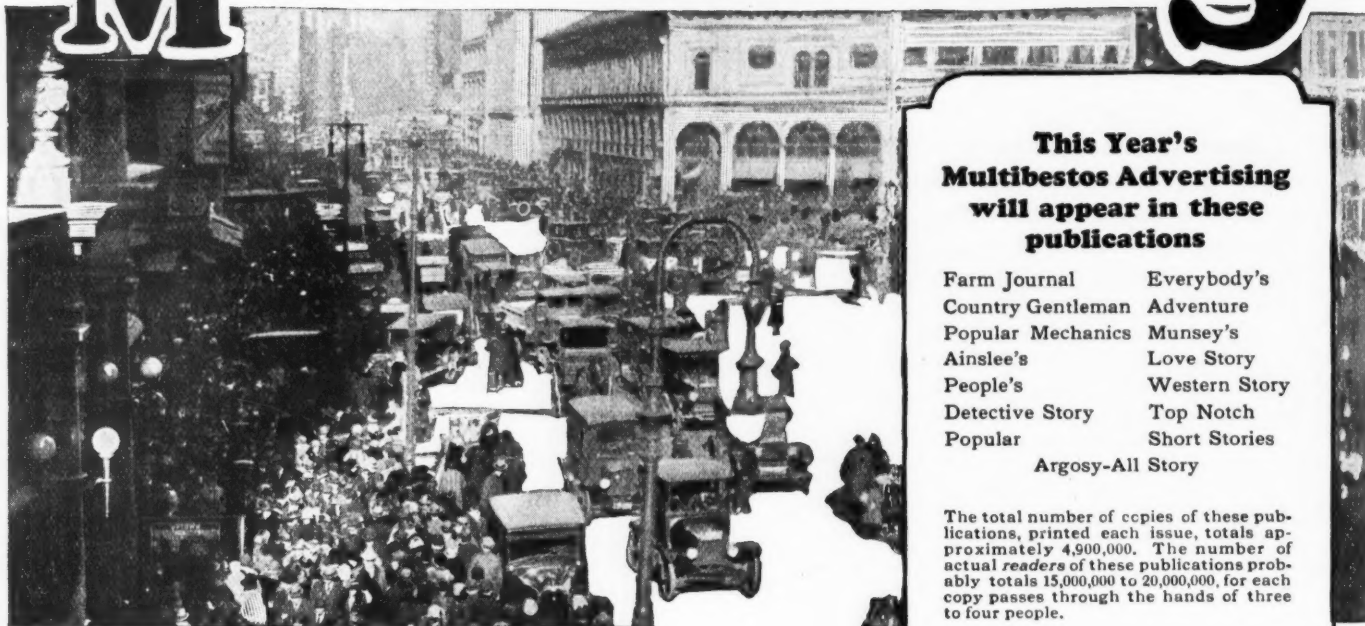
The
B. F. GOODRICH RUBBER CO.
Akron, Ohio

Goodrich TIRES

"Best in the Long Run"



Many More People Are Hearing About MULTIBESTOS



This Year's Multibestos Advertising will appear in these publications

Farm Journal	Everybody's
Country Gentleman	Adventure
Popular Mechanics	Munsey's
Ainslee's	Love Story
People's	Western Story
Detective Story	Top Notch
Popular	Short Stories
Argosy-All Story	

The total number of copies of these publications, printed each issue, totals approximately 4,900,000. The number of actual readers of these publications probably totals 15,000,000 to 20,000,000, for each copy passes through the hands of three to four people.

THIS year the biggest audience we ever talked to will read about the Brake Lining with the Interlocking Weave in *their own favorite publications*.

Among these hundreds of thousands of readers there's a great big percentage of men and women who are keenly interested in automobiles and everything that has to do with automobiles.

These same people have been listening of late to the widespread talk about brakes and their relation to safe driving.

That's why it's going to pay you to push Multibestos this year.

It will pay you because of this increased interest in brake linings—Multibestos in particular. And because of the real reputation Multibestos has among car owners. And because, with Multibestos, you can secure the famous time-saving, money-saving, *Multibestos Method* of relining external brakes. Write for full information about this revolutionary method.



DEPARTMENT M.A.-2

MULTIBESTOS COMPANY, WALPOLE, MASS., U. S. A.

NEW YORK
15 West 63rd Street

CHICAGO
1241 Michigan Avenue

NASHVILLE
1200 Broadway

DETROIT
930 Taylor Avenue

SAN FRANCISCO
1035 Polk Street

EXPORT OFFICE—461 Eighth Avenue, New York

MULTIBESTOS

THE BRAKE LINING

with the Interlocking Weave

Fine prices don't make fine motor cars

Studebaker's 150,000 production—the world's largest output of *quality* cars—takes the mystery out of "price class."

Fine materials and fine workmanship, pride in attaining the superlative—more than these cannot be embodied in any car *at any price*.

That's all the maker of a high priced car can offer. That's all the most costly foreign car can embody.

In a Studebaker—as you well know—you'll find them both. *But priced low.*

That's because we make so many. Our "overheads" are distributed among 150,000 cars.

If we made only 20,000 cars a year, we couldn't come within a reasonable distance of present Studebaker prices.

So in a Studebaker there's "more for the money." And that's what the public wants.

L I G H T - S I X		
5-Pass. 112" W. B. 40 H. P.		
Touring	\$1045	
Roadster (3-Pass.)	1025	
Coupe-Roadster (2-Pass.) . .	1195	
Coupe (5-Pass.)	1395	
Sedan	1485	

S P E C I A L - S I X		
5-Pass. 119" W. B. 50 H. P.		
Touring	\$1425	
Roadster (2-Pass.)	1400	
Coupe (5-Pass.)	1895	
Sedan	1985	

(All prices f. o. b. factories)

B I G - S I X		
7-Pass. 126" W. B. 60 H. P.		
Touring	\$1750	
Speedster (5-Pass.)	1835	
Coupe (5-Pass.)	2495	
Sedan	2685	

THE STUDEBAKER CORPORATION OF AMERICA
South Bend, Indiana

THE WORLD'S LARGEST PRODUCER OF QUALITY AUTOMOBILES



Nash Leads the World in Motor Car Value

And February Was Our Greatest February

Nash business for January, 1924, surpassed the best previous January.

And, as we prophesied 3 weeks ago, February rolled up the largest sales volume in the history of Nash Februarys.

Nash is getting the habit of breaking sales records and Nash dealers are getting the habit, too.

If you're a good dealer and it has been a long time since you broke a record with your present line you might find it mighty profitable to change to the Nash line.

The Nash franchise is about as sure and certain a way to make money as you can find in the industry.

If you want to keep the red ink figures out of your books this year drop us a wire saying you're interested in a Nash territory.

And—there's no time like today to do that.

NASH

THE NASH MOTORS COMPANY
KENOSHA, WISCONSIN

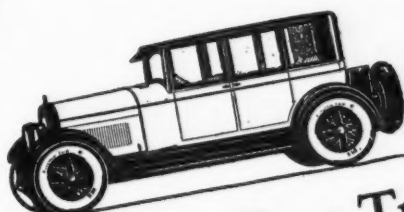
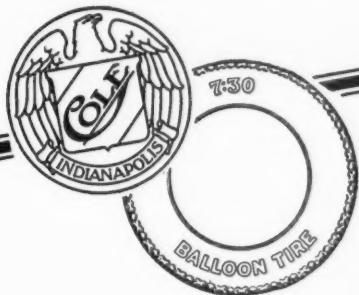
Nash Leads the World in Motor Car Value



(2789)

We are concentrating Cole Advertising in local papers where it will be most helpful—

Below is a reproduction of an advertisement from our Spring campaign



Have You Ever Tried "Ballooning" in a Cole?

THERE is no adequate way of describing a ride on balloon tires—particularly in a Cole. It is even a greater surprise than the first time you ever walked on rubber heels.

You literally ride in a relaxed, undulating freedom that is more like the surfaceless slide of a coaster sled or the gliding of a motor boat through smooth water when the engine is shut off.

You take a particular delight in hunting out some bad-looking spot in the road in an effort to try and make yourself feel the bump—but nothing happens—the big air cushion of the balloon tire absorbs the shock.

What you see in the road is apparently not there when you ride over it. But there is more to "ballooning" in a Cole than just riding comfort.

It means uncomplaining car service at far less maintenance cost than on ordinary tires.

Balloon equipped Coles have an almost uncanny way of reeling off almost a mile of sumptuous, economical, luxurious motoring at, we believe, the lowest operating expense of any car of the Cole type.

It is a notable fact that, when universal acceptance of balloon tires became inevitable, Cole alone was ready, engineeringly, for their adoption.

Cole was not only first to adopt balloon tires, but to engineer for them.

We are ready to give you this great new experience of ballooning in a Cole.

When may we call?

DEALER'S SIGNATURE
ADDRESS - CITY AND STATE

COLE

There's a Touch of Tomorrow in All Cole Does Today

President.

COLE MOTOR CAR COMPANY
INDIANAPOLIS, IND.

"I am more than ever convinced that this is the year of years for fine cars like Cole"



The Men Behind the Templar Guns

THEY know their business. They know what the dealer wants — what he is entitled to and what he **MUST** have in order to conduct his business profitably.

T. L. Hausmann, President of the Templar Motor Car Company was one of the largest independent dealers and distributors for years and a manufacturer of long experience before he undertook to re-establish on a firm and enduring basis the new Templar Motor Car Company. He has both the dealer's and the manufacturer's viewpoint. In him they are combined in one man.

He has therefore caused to be formed—

- | | |
|---|--|
| <p>1 The Templar Dealers' Association. YOU OUGHT TO KNOW ABOUT IT.</p> <p>2 He has built a car with specific guarantees for one to two years and YOU OUGHT TO KNOW ABOUT THESE!</p> <p>3 He has adopted a tried and proved merchandising plan to sell your used cars, which plan is handed to you when you sign the Templar Dealers' Plan and Agreement.</p> | <p>4 He has adopted for the Dealer an intensive new car merchandising and selling plan, which becomes yours when you sign the Templar franchise.</p> <p>5 He has arranged for a great general campaign of cooperative newspaper advertising, a campaign that is a series of smashing blows that will hit the consumer right between the eyes.</p> <p>6 He has seen to it that the Templar Dealers' Plan and Agreement provides against over-crowded shipping schedules, gives you absolute protection against price reductions, gives you a voice and vote in factory policies and manufacture.</p> |
|---|--|

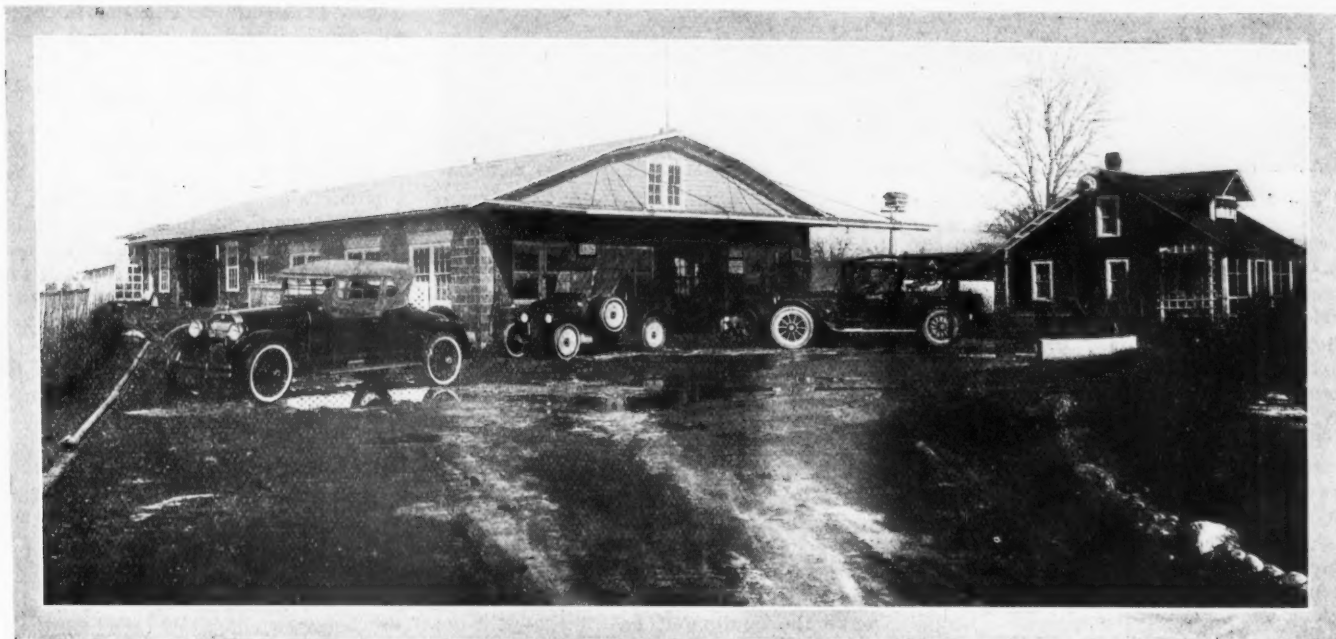
For 20 years he coped with the same problems and difficulties with which the dealer is handicapped today, therefore he is on the same side of the fence with the dealer today.

The men in the new organization are all men with successful records of accomplishment behind them in the automotive field. They know their business. They're on the job.

Write to the president. Telegraph or come to the factory in person. Do it today.

TEMPLAR MOTOR CAR COMPANY
Templar Park Cleveland, Ohio

MOTOR AGE



The Hintz garage, a real place to get a car reconditioned

How One Maintenance Shop Flourishes — Five Miles From Town —

Service That Satisfies Is the Magnet that Draws Car Owners From Cities and Villages to the Cross-roads Establishment of Harry Hintz

By A. H. PACKER

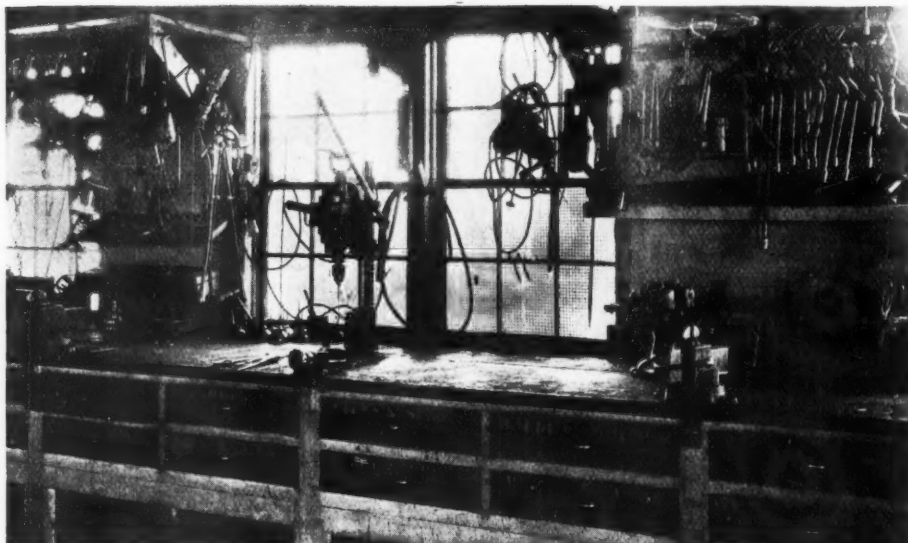
In the following article a MOTOR AGE writer describes the successful methods used by a garage proprietor to build up a profitable automobile maintenance business at a cross-roads, five miles from the nearest town of any consequence. It is worth while to consider the methods by which this man induces the car owners from surrounding territory to drive to his place to have their work done. The photographs tell an interesting story.

FIVE miles from the nearest town, which happens to be Dixon, Ill., nearly three miles from the main highway and yet doing a large proportion of the overhaul jobs within a radius of 12 miles. That is the record of the Hintz Garage. Is an ideal location essential to a flourishing business? We used to think so, but think so no more. The record of business achievement set by Harry Hintz has shown that good work is the best advertising ever written and an irresistible magnet.

A screw driver and pliers mechanic? Hardly. He

would not long survive that way out in the corn fields. A Packard sport roadster is his wrecking car, the back of it, of course, built especially for the purpose, while a Packard Twin serves him when he needs to go to town.

His shop would serve as a tool catalogue for many equipment makers. The whole side of one wall is covered with socket wrenches, spreaders and special tools, all hung up, visible and ready for action. Under this layout of tools is the work bench with a double row of drawers, each containing certain things AND EACH ONE



If you know the fundamental requirements of motor car maintenance, this picture will reveal something unusual about the shop and the man who runs it

PLAINLY MARKED with the name of the parts inside.

He has a hoist, and an overhead trolley so that engines may be run to any part of the shop. There are also a couple of spur tracks on the overhead trolley so that a load may be shunted out of the way if need be.

He has a 20-ton press for straightening heavy parts and doing heavy press work. He has a heavy drill press provided with a foot switch so that, should work get stuck, the releasing of the switch will stop the drill. He has a power hack saw, a valve refinishing grinder, an electric test bench, while in his tool room he has shelf after shelf of bearings, bushings, valves and wrist pins, standard and oversize.

Everything for Efficiency

No power lines come to the Hintz Garage and none are needed. Two 110-volt generators are used, each driven from a four-horsepower engine, and but one of these units is used at a time, the other being held in reserve, while 58 large battery cells serve to give a reserve supply of electricity.

The grease barrel is used for grease, not for grease mixed with dirt, nuts and bolts, and any miscellaneous parts that might fall in. A metal cover insures keeping the grease clean and a rope to the ceiling with a weight for counterbalance makes it easy to take the cover off and hard to lose it.

Small parts commonly and frequently used, such as cotter pins and lock washers, are held in small compartments in a rotary cabinet, so that it is not necessary to lose ten cents worth of time getting an item worth one-tenth of a cent.

Drop lights are there, not the kind that are laid on the floor and smashed every time a car goes out, but the kind that roll up when not in use, like the roller of a shade or the trolley rope retrieving device on the street cars.

Welding, yes, they do that, with acetylene and oxygen, while the commonly

called for springs are kept in stock on a rack in a rear stock room.

Last, but far from least, is the office equipment, comprising chiefly a desk, a typewriter, a cash register, an adding machine and a credit file.

Will you find half of these things in the average small town shop? Well, hardly, and not always such up-to-date equipment in some of the larger places. What, then, is the answer? Merely this, that good work, a wholesome respect for the need of office records and a realization that flat rate work was necessary to make the equipment pay for itself have not only provided a living for Harry Hintz and his family, but have practically paid for both the building and the machinery it contains.

"But who taught you how to keep books?" I asked.

"We got that information from the concern that sold us the register. Seven hundred and eighty bucks is some money to pay for a machine, but we tried two or three other systems and have thrown them all out, and this is the best we've seen yet. It has to be good, for it takes the place of a bookkeeper for us. Gives

us all the information we need for our records, and the one book we keep is an easy job from the tickets we get from the register. Got stuck once on the books, and the concern was on the job right way, sent a man to us and straightened us out and we have had no trouble since.

"Keeping track of everything enables us to know which items really make us a profit and which do not, for our register tickets make it possible to separate the business into the sale of gas, oil and grease, repairing, accessories, tires, service stock, welding and special items. Then if we start to lose money we know it before the condition goes too far."

"And how about the filing system?" I wanted to know.

"That," said Hintz, "enables us to see at a glance just what each of our credit customers owes us. The front part holds the slips made out for the day, while the back part holds the continuous record. At the end of each day we put the slips into the back part and add the new items to the old totals and these figures are easily seen, so that we can call a halt if some customer is running his bill up too far, but with the men around here that we have known all our lives it is pretty hard to insist on a strictly cash basis."

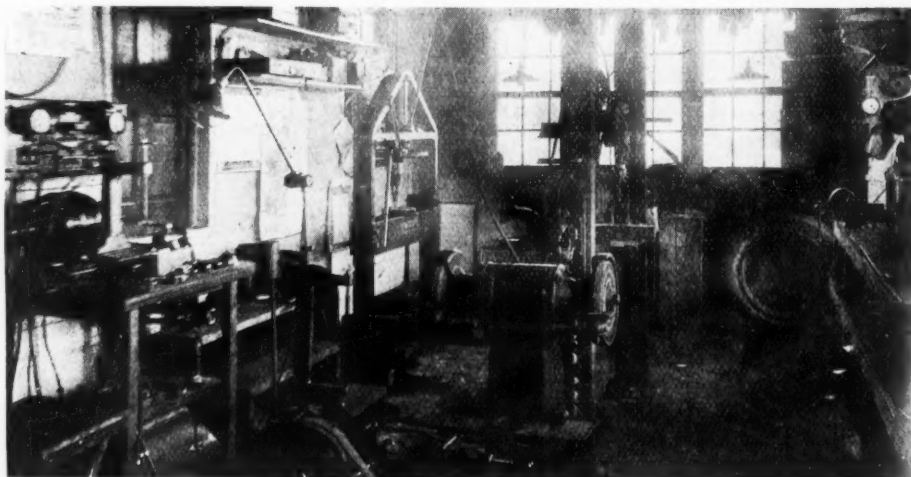
"Then, I suppose you have no further use for your adding machine."

"No," said Harry, "we wouldn't part with that, for we depend on it to enable us to accurately and quickly check up our books when, at the end of the day, we have apportioned the items to the various accounts."

I was nearly through looking at his office equipment, but there was one thing more that Harry wanted to show me.

"This typewriter is not used much of the time, so to keep it clean we use this metal cover, but we have it hooked up with a rope and a weight like the cover on the grease barrel, so that we just shove it up toward the ceiling in order to write a letter and when through pull it down again."

"Do you advertise?" I wanted to know.



The heavy artillery back up the barrage from the multitude of small tools

"Yes," Harry answered. "We have the big arrows, our trade mark, on all the fences around here and all of them point in our direction, and then we show a slide in the movie in Dixon every three months and at those times we run it every night for two weeks."

Next I wanted to know how car owners could bring jobs to him even if they wanted to, for without a street car line or train or bus service, how in the name of common sense did they ever get home again?

Harry laughed. "That's easy," he said, "we take them home or lend them a car, for we have one or two Fords around here if they want to drive one of them. Usually find it better, however, if their own car is in running condition, to take them home in it. Then we know after driving several miles, just about what is wrong with it. The same way when a job is done. We drive around here with the car owner for several miles, try the car out on the hills and make sure that everything is O. K."

The Story the Hotel Man Told

It may have been a sly trick, but I really wanted facts, so I asked the hotel man where I should take my car if I wanted a good job done on it, and he mentioned some one up the street. Then I said, "Now, give me the straight goods, for the best job, one you can depend on, where would you take your car?"

"Well," he said, "whenever I have time I take mine about five miles from here to a fellow out in the country," and he described the way to the Hintz Garage. And that was that.

But not quite that, either, for the next day I met him there, out to see how they were coming on a complete motor overhaul on his car. He had driven out in a Ford to see how the job was coming, and he wanted to know when it would be done, and they wouldn't promise, for they do the jobs well and hurry not, and if you want a rushed and hurried and careless job, then you have come to the wrong place.

But the hotel man did not get mad or



Just over the hill is the Hintz garage. The snow drift shows where the traffic goes



Around Dixon they take these "hints" to go to Hintz

want to take his car away, and before he went he told them while they were at it to order a new fender, too, for he wanted to have his car painted after it was put in shape mechanically, for he wanted it to not only be like new but look it, too.

How They Work

Harry Hintz and his brother and one mechanic are the men on the job in winter, while in summer two extra mechanics are employed. These men get a straight salary and work ten hours a day

six days a week, except that they each get a half day off, but not on Saturday, and in this way the shop is always able to take care of the car owner's needs. No overtime, though. Harry says, "When a man has worked ten hours, it's plenty, no sense in working longer or he would be no good the next day. No Sunday work, either, unless someone is in trouble and calls the house, then we go out and pull him in, but that's as far as we go."

What Happened to the Bearing

Overhauling a rear axle while I was there, the mechanic took one of the bearings apart and brought the balls in his hand to show to Hintz. "One of these is a little oversize," he said.

"Someone probably replaced a broken ball, sometime, without using the 'Mikes,'" said Harry. "Races are probably somewhat worn, better pick out a set of oversize balls, and fix it up that way."

How many shops do their work that carefully? How many try to get along without micrometers and then say, "Oh, you can't do careful work like that in the small places." Folks won't pay for what it costs. But they DO pay for it and go five miles for the privilege.

And Flat Rate Makes It Possible

But, what does it mean, this garage in the corn fields? Good work has brought the business, but good work alone does not make the money. Management does that, and records make the management possible. Failure would be inevitable with the enormous investment which his shop equipment represents if Hintz did not realize that the profit per hour was not the difference between what he collected and what he paid his mechanic. The cost of his building, the depreciation on the tools he may not have to the last decimal point, but he knows they have a big effect on the year's results, and he makes allowances accordingly, and charges for labor on a flat rate basis.

The proof of the pudding is in the eating and the proof of the business is in its success. Good work, honesty, flat rates and management that recognizes the value of records has made the success possible.



If he has to be pulled in, it helps some to have a good car do it

The Field of Ford Service

Half of the Cars in the U.S.A. Are Fords



By B. M. IKERT

MEN who have to do with the sale, servicing and maintenance of automobiles have long been familiar with the fact that there is one Ford for every motor vehicle of any other make. The predominance of this particular motor vehicle in the low priced field of both passenger cars and trucks is a long established fact. It is a fact that cannot help but have a profound influence upon the maintenance industry because of the almost universal demand upon shops of all types, sizes and affiliation at some time or other to render service on a Ford vehicle.

The total registration of cars and trucks in the United States on Dec. 31, 1923, was 15,281,295, divided as follows: passenger cars, 13,484,939; trucks, 1,796,356.

The number of Fords in operation on that date was estimated by the Ford Motor Co. at 49 per cent of the total passenger cars and 61 per cent of the trucks. Accepting these figures as approximately correct we find the total registration divided as follows:

Ford cars and trucks..7,699,295
Other cars and trucks..7,581,818
Excluding trucks the passenger car registration divides itself approximately like this:
Fords6,603,620
Other makes6,881,319
Taking trucks alone the total

divides this way:

Fords	1,095,777
Other makes	700,597

There are also approximately 300,000 Fordson tractors in use embodying a power plant with many typical Ford characteristics.

The important part that the servicing of Ford cars and trucks plays in the automotive maintenance industry is known to every dealer, shop proprietor and garage owner. For this reason the maintenance man should not underestimate the profit possibilities in this field of work. Nor should he regard too lightly the nature of the work itself, for there is just as much need for skill and competence and efficiency in the Ford shop as in any other. In this and other articles to follow MOTOR AGE has brought together a wealth of information on Ford service and will present it in a comprehensive and logical manner designed to be of value to the shop proprietor who wants to make the most of the opportunity offered for service by nearly 8,000,000 Ford vehicles.

Other articles on this subject to appear in succeeding issues of MOTOR AGE will include:

- Parts Replacement Simplifies Ford Maintenance.
- Selling and Installing Accessories for Fords.
- Specialized Service Work for Fords.
- Servicing the Ford Power Plant.
- Servicing the Ford Chassis.
- Flat Rates for Fords.
- The Well Equipped Ford Shop.

The next article will appear in an early issue of MOTOR AGE.

If all Ford service and maintenance were performed at authorized sales and service stations of the Ford Motor Co. it would mean an average of 850 motor vehicles to be serviced by each of the approximately 9,000 authorized stations. Some could handle this volume and others could not.

The service requirements of Ford motor vehicles, however, are by no means attended to exclusively by authorized Ford representatives. Despite the fact that the Ford Motor Co. has gone to extraordinary lengths to see that its authorized representatives are equipped to render most efficient and economical service there will always be a large field for the servicing of Ford vehicles by the general repair shops and the shops engaged primarily in the sale and servicing of other makes of cars.

The field of Ford service is naturally a competitive one. The volume of business is assured by the immense number of vehicles in

operation and the almost constant use to which they are put. The wide-awake authorized Ford representative naturally is making a great effort to bring into his shop as large a proportion as possible of the Ford vehicles operating in his territory. He has the advantage of the factory's reputation, its service methods and counsel and the privilege of buying parts most advantageously.

Nevertheless there are many general shops, some specializing on Ford service and some attending to all makes of cars, which are doing and will continue to do a large volume of Ford maintenance. It is the shops, whether authorized or independent, which show to the car owners that they are equipped to do the work most intelligently, efficiently and economically that will continue to prosper by getting their share of the immense volume of Ford service which is incidental to the operation of nearly 8,000,000 Ford motor vehicles.

A reliable survey has disclosed that in the shops of dealers selling and servicing other makes than Fords approximately one-third of the work is on Ford units. In the general or independent shops not officially affiliated with any make of car the same survey discloses that the volume of work is about evenly divided between Fords and other makes.

A Growing Field

With the gigantic number of Ford vehicles in the field it must be remembered also that this year's contemplated production of Ford will add more than 2,000,000 cars and trucks. Altogether this means that the industry will be called upon to sell, service and maintain Ford cars and trucks numbering between 9,000,000 and 10,000,000.

With this picture of the vast field of Ford service in mind it becomes at once apparent that the possibilities of profits through maintenance work are greater than ever for the Ford dealer, Ford service station, the general garage and for the dealer whose maintenance work is necessarily split up on all makes of cars.

With half of the cars in the country Fords, and with approxi-

mately 9,000 Ford dealers, it becomes at once apparent that the adequate care of the 9,000,000 or 10,000,000 Ford units which will be operating in the country before the year is over will bring a great volume of work into both the authorized Ford shops and the general shops.

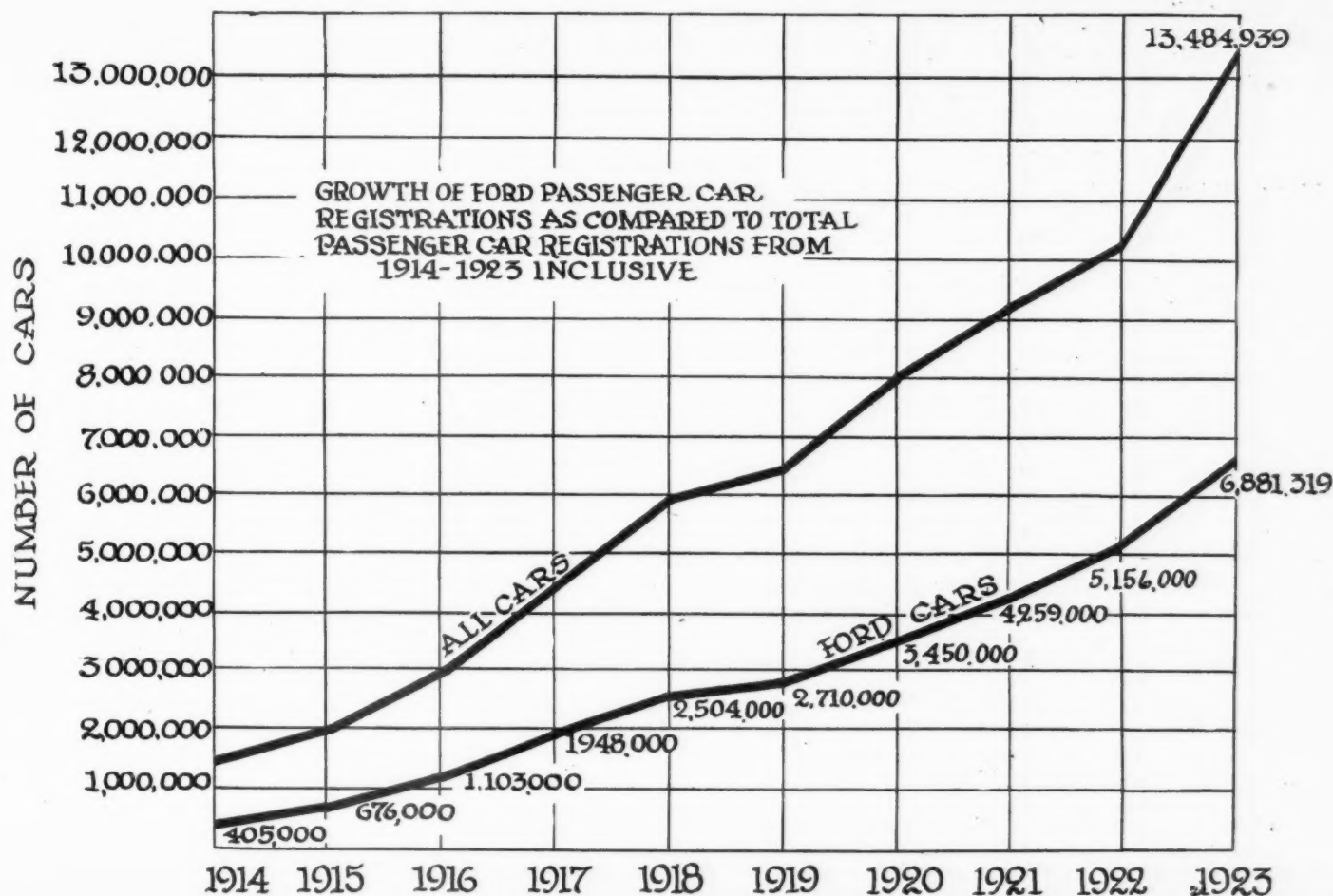
The independent shops and the dealers other than Ford dealers naturally fit into this picture, and the concerns which today are making preparations to cope with this gigantic task are the ones which this spring and summer, especially, will secure a large share of this service work and profit in proportion.

Equip for Service

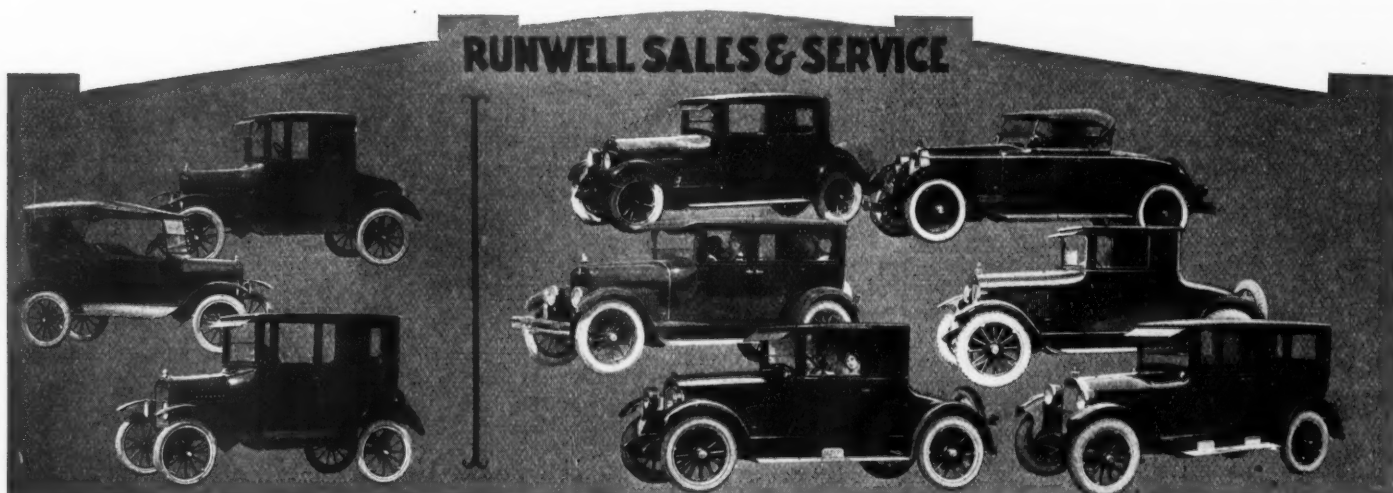
Regardless of whether it is a Ford dealer or independent shop, both must make proper preparations to handle the great volume of Ford work that is before them this year. This may mean doing several things. For one thing, it may mean that more space must be provided, accomplished by adding floor space, or, as has been done by many, by equipping a plot of ground for outside service, usually termed "quick service."

Those who find it difficult to provide more space for adequately handling their service may have to re-arrange their present quarters to get more work out of the same number of cubic feet. Many shops and service departments are laid out rather poorly when it comes to handling a large volume of work and some thought in the direction of making the building more efficient for the service required is worth while at this time by dealers and garages in general. More room often may be secured by ripping out the work bench along the wall and installing individual benches for the mechanics. These benches can be rather small, because there is no need for a large bench, especially since the maintenance work on lower priced cars especially has resolved itself largely into a matter of replacing parts. Too much space is wasted in many of our shops today because the workbench is used for storage purposes.

Next to having the desired floor space there must be sufficient equipment to quickly and efficiently perform adjustments and



A chart showing the registration figures of Ford cars as against those of all cars from 1914 to 1923. Note that the Ford figures uniformly run about one-half of the total for each year



About one-third of the non-Ford dealer's service work is done on Ford units and hence his place of business must be organized accordingly

repairs. The independent shop and garage is not as a rule so well laid out for performing Ford service work as is the shop of the Ford dealer and Ford service station, because the latter have tooled up especially for this work and have put it more or less on a production basis.

Nevertheless, with a little modification the independent shop and garage easily can equip and tool-up for Ford service work. For example, most of the manufacturers of arbor presses provide attachments which are intended especially for performing certain operations on Ford cars. Therefore, such a press not only can be used to advantage on other makes of cars, but does equally well for Ford work.

Piston aligning fixtures, for example, are equally well suited to all types and makes of connecting rods. Likewise there are burning in and running-in machines which accommodate the Ford engine as well as any other make of engine. Naturally on account of its individuality of construction the Ford car requires certain operations in service not common to other makes of cars. The service work in connection with the planetary transmission of the Ford, for example, is wholly different from that in connection with the conventional form of selective sliding gear type of transmission found in other cars.

Special Equipment Needed

This condition makes it necessary that the maintenance shop install equipment particularly adaptable to servicing the Ford transmission. There are many small tools on the market designed to speed up service work on Fords and although these tools are adaptable to Fords only they are very much worth while and should by all means be included in the preparations for handling Ford service.

Mention was previously made that much of the work in connection with the servicing of low priced cars, especially Fords, consisted of replacing of parts. The low cost of Ford parts makes this particularly desirable and the next step to be considered after sufficient space has been secured and the necessary equipment installed, is to make sure that there is an adequate supply of parts. This is absolutely necessary to insure prompt service during the early spring months when the volume of work peaks.

There can be no question but that the coming season presents a real opportunity as to servicing Ford units for the dealer, service station and garage which have placed themselves on a well-organized basis and are operated in a business-like manner. The service work is here and it is merely a question of getting ready to handle it intelligently and on such a basis that profits are assured. While the Ford car, and in fact any car for that matter, has become an all-year proposition, the fact remains that more cars are in use in summer than in winter, owing to geographic and other reasons. More trucks are used and it is, of course, the time for tractors. There will be times when the dealer will be loaded with service calls and the shop will be up to capacity. The manner in which this great volume of Ford service work will be handled at these congested periods will depend largely upon how well the plans have been laid, the shop equipped and the parts stocked.

The immediate problem confronting all the dealers in connection with this service situation is to get more intensive service from their present facilities. This is possible in several ways and some of them have already been mentioned. In addition to these, better accounting methods, better advertising, the piece work system, premium plan of compensating mechanics and similar things all will help to smooth the way for more intelligently and efficiently handling the work to come.

The fleet operators must not be overlooked in this potential Ford service business. In every town of any size there are concerns which operate anywhere from two to a dozen Ford cars or trucks and on these commercial vehicles it becomes highly essential that their usefulness as transportation vehicles be uninterrupted. True, many of those who operate a fleet of trucks incorporating a large number of vehicles have their own service stations, but this usually is only the case in the very large cities. The fleet operators of the smaller towns must look to the Ford dealer, service station, garage or others for their maintenance work.

What has been said before regarding the selling of Ford service and maintenance applies to quite an extent to the selling and installing of accessories for Fords. Inasmuch as the Ford dealers do only a certain portion of the required Ford service work it follows similarly that the selling and installing of accessories and supplies required and demanded by Ford owners overflows into the shops and stores of other dealers and garages.

According to available statistics the proportion of Ford dealers handling supplies and accessories is about 60 per cent. The other outlets, therefore, for the supplying of accessories and their installation, lie in the garage, the dealers who handle other than Fords, and in the independent repairs shops. There are some 31,000 of these latter organizations not connected with dealer establishments, everyone of them having within its grasp the opportunity to cash in on the potential profits which come with the selling and installing of accessories for Fords.

On the basis of returns to a questionnaire by car dealers not authorized as Ford dealers, it was determined that about 63 per cent of such dealers handle supplies for Fords. Consequently, on this basis, about 8,209 of the 13,030 non-Ford car dealers selling supplies handle merchandise for Fords. No doubt many others will be handling it before the year is over.

Opportunity for All

Viewing the field of Ford service, therefore, from its broadest aspect we find that the immense volume of maintenance required by the millions of Ford motor vehicles not only fills the authorized Ford service stations with profitable business and opens up to them the opportunity of increasing their business, but also overflows into the shops of dealers in other lines and into the general repair shops.

We find that last year the Ford Motor Co. added more than 2,000,000 units to the number of its vehicles placed in operation and that its schedule this year calls for an even greater production. The added output is likely to mean that before the end of the year more than 9,000,000 Ford cars and trucks will

be in useful operation and that the service requirements will be proportionately increased over the great volume the dealers, service stations and garages are now called upon to render.

The Ford Motor Co. will see to it that its vehicles are serviced. It gives its authorized stations every assistance in the proper servicing of these vehicles, but it has also made it possible for the general shop to successfully service Ford units. The company has provided that the independent garage man may purchase parts at a discount and it has made available to him either directly or indirectly much valuable information for the guidance of his work. It has simplified the service methods on its vehicles to the greatest possible extent and this in itself aids in the intelligent servicing of the vehicles. If the established and existing facilities do not measure up to the job it will see that others do.

It is apparent that the shops which expect to profit by this business must make suitable preparation. They must assure their customers of prompt service which means among other things the carrying of adequate stocks of parts. They must take steps to get the most intensive results from their service facilities and personnel. The fleet owner with a flock of Fords must not be overlooked. His wants usually require prompt attention.

A view of this field would not be complete without taking notice of vast possibilities presented for the sale and installation of accessories for Fords. Every Ford car that comes into the shop for service may properly be looked upon as a prospective customer for one or more items of equipment which the shop should sell and install. This is not because the Ford car as it comes from the factory is not a roadable vehicle. It is rather because human individuality makes it possible for a market always to exist for something that is different. And then, too, there are certain articles of customary equipment, not absolutely necessary, which the Ford factory leaves off in the interest of economy which Ford dealers everywhere are able to supply at the option of the purchaser. The possibilities for profit in the sale and installation of accessories and equipment should not be overlooked by any dealer or shop engaged in the servicing of Ford vehicles.

As the recent Ford Service Bulletin puts it, "The business is there—it is running past your door every day. The needs of service are unlimited and every dealer who is in a position to meet this service demand can view the future with confidence that profits will be returned in proportion to the quality of the service given."

(The next article of this series will deal with simplification of Ford maintenance through parts replacement and will be published in the near future.)

Ambulance Feature for the Doctor's Car

THE Victory Motor Sales Company, Paige and Jewett dealers in Oakland, California, has devised an improvement in the Jewett brougham whereby a complete bed, 73 inches long and 40 inches wide can be made, conveniently and quickly, inside the car.

To make such a bed, the pins are pulled out of the hinges of the front seats, the cushion of the rear seat is slid flat on the floor, a pillow mattress, dropped into the back seat space, is spread over the level surface so provided, and the bed is ready for sheets, blankets and pillows.

A half width bed, for the use of physicians in converting their cars into emer-

gency ambulances, can be made by simply removing the hinge pins from one of the front seats and making up the bed in one half the space for the full-width bed.

The company has a car so converted into a bedroom on its showroom floor and is making a sales drive among physicians and campers. Advertising in the newspapers, on billboards and in the windows of the salesrooms is reaching the campers and motor tourists. The physicians are being sold by means of 500 letters sent to members of the profession, each letter containing the accompanying photograph of the bed.

The letter to the physicians, which is getting results in actual sales, reads as follows:

"Dear Doctor:

"A standard coach to a utility ambu-

lance in three minutes! Now then, Doctor, just a few minutes with the new Jewett coach, please. Here we have not only a family car and a business man's automobile, but look what we do with it in the way of a utility ambulance.

"And it's comfortable and roomy. With its baked enamel steel body and sturdy, smooth mechanism, this automobile, built by Paige, tells a wonderful story of successful car manufacture. We welcome your attention to this new Jewett, Doctor. All models of the handsome Paige family, 'the most beautiful car in America,' are here for your inspection. Or, if you wish, a ring will bring one of our salesmen to you at your convenience.

"Very truly yours,

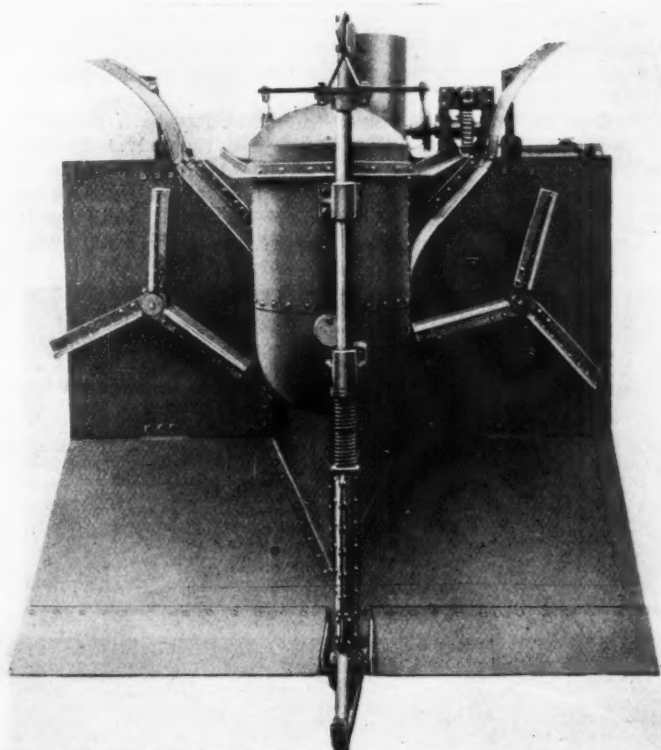
"VICTORY MOTOR SALES COMPANY."

Monarch Company Brings Out Twin Rotary Snow Plow

A GASOLINE-driven twin rotary snow plow, intended primarily for snow removal upon the highways, has been brought out by Monarch Tractors, Inc., Watertown, Wis.

The outfit weighs about 4,500 lbs., is 8 feet in width, and is a self-contained unit, powered by a Beaver heavy-duty industrial engine. The two heavy steel fans are chain driven at a speed of about 350 r.p.m. Each fan can be disconnected independently by means of a twin disc clutch. The fan runs on heavy Timken bearings and the whole construction is strong and simple.

The front shoe and rudder are designed to assist in steering, but the plow can be controlled by the tractor through heavy, oscillating push bars attached to the crawlers. Movable vanes around the fan control the height and distance at which the snow may be thrown.



Front view of the Monarch twin rotary snow plow, driven by a crawler type tractor. The vanes around the fans control the distance and height the snow may be thrown

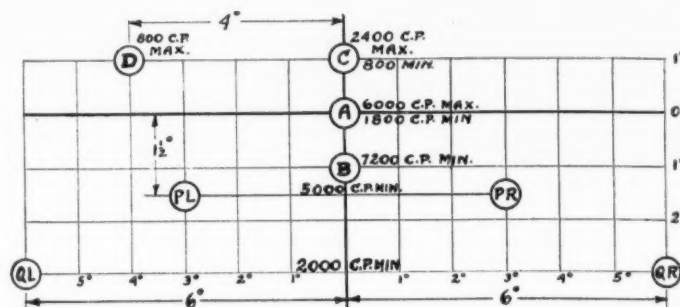
New Edmunds & Jones Headlight Incorporates New Principles

Elliptical Reflector Chief Factor in Meeting Present Engineering Specifications

THE new Edmunds & Jones model 20 headlight which was introduced at the automobile shows and mentioned briefly in the news columns of this paper, represents the culmination of several years' experiment by the Edmunds & Jones Co., which has specialized on lamp manufacture for the past 20 years.

During the course of the experiments on the type 20 headlight, it became necessary to construct a laboratory with special equipment suitable for testing the operation of every part of the lamp, as well as the complete lighting unit, the result being one of the most complete laboratories of its kind in the United States.

According to the manufacturer, the light has been designed with two main objects in view. First, that the driver be able to see obstacles or obstructions a sufficient distance ahead to enable him to bring his car to a stop or avoid them, even when traveling at high speed, and he must also distinctly see adjacent to the curb or roadway. Second, other road



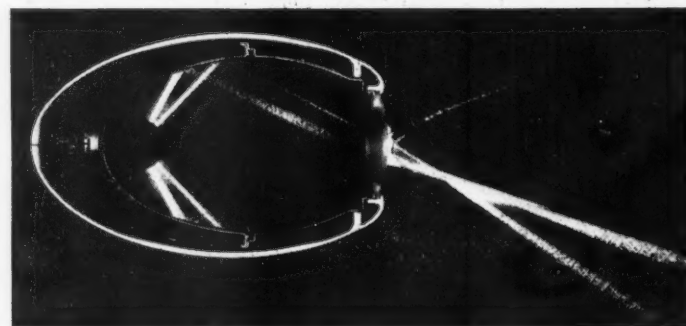
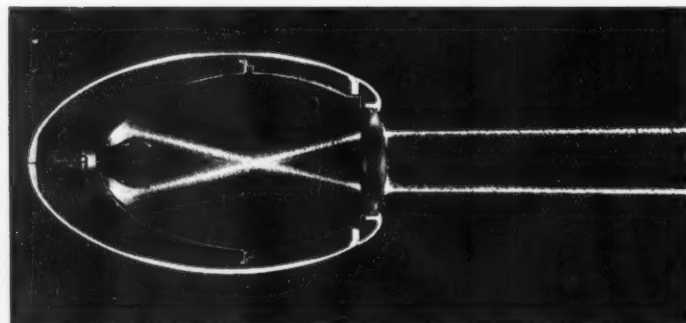
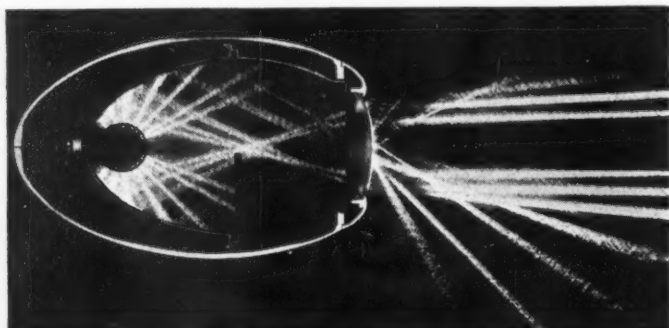
Illuminating specifications adopted by Illuminating Engineering Society and Society of Automotive Engineers which the new E. & J. type 20 head lamp is claimed to meet perfectly

users, including motorists as well as pedestrians, must not be dazzled by the light.

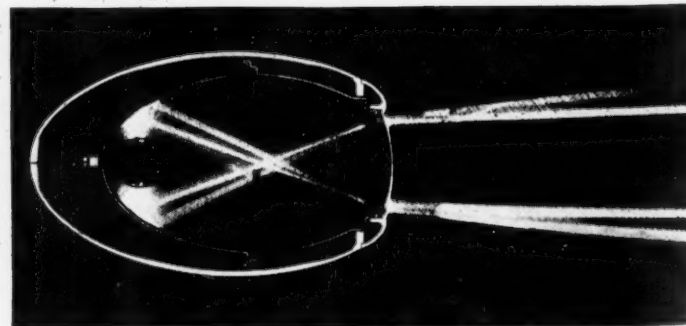
In developing a headlight to meet these two conditions, a number of deviations from previously accepted headlight practice have been made. Probably the most radical departure is in the adoption of an elliptical reflector instead of the usual wide-mouthed parabolic form. By using the elliptical reflector housed by an egg-shaped casing, designers have been able to employ a lens opening less than 4 in. in diameter.

The lens is a clear glass condensing type through which is projected a beam of composite coloring. The small opening permits of an effective redirecting of a large portion of the light, thus securing a driving beam of high intensity.

The intense silvery beam portion is deformed by the lens to an inverted fan-shaped section or pattern which affords the



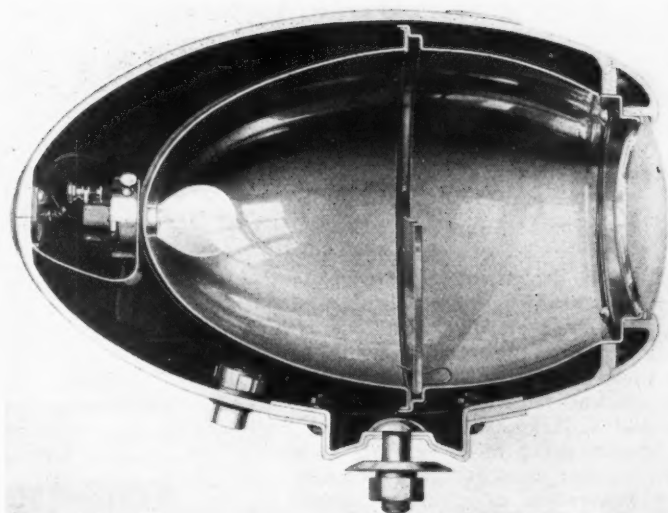
Left, top to bottom: Smoke box photographs. Illuminating path of light rays from source of light to reflector and to the lens. Due to the amount of red in the amber filter, the rays passing through it do not photograph properly
Path taken by long range rays for a distance of 500 ft. All rays pass over the amber color filter
Path taken by short driving range rays which fill in from rays



shown at right, to within 10 or 12 ft. of the car. Less than half of these rays pass through the color filter
Right, top to bottom: Path taken by close-up driving range rays which fill in from rays shown at left, up to the car front. Less than half of these rays pass through the amber color filter
Path taken by driving range and ditch rays. All except the upper rays pass over the amber color filter.



New Edmunds & Jones type 20 headlight which is featured by an elliptical reflector and contains an amber color filter for the upper rays



Section through E. & J. type 20 headlight showing mounting of color filter, reflector, focusing screws, lens and general construction. The body, cover and lens ring are die-cast aluminum.

desired spread on the roadway surface, while also providing a more elevated central distance beam portion of high penetration. Above the brilliant road-lighting beam is a softer beam of amber glow sufficient for illuminating objects above the level of the lamps, but due to its amber color, it is claimed to be not distressing to the eye of the approaching traveler.

The amber color is secured by means of a color filter mounted within the lamp at the focus of the lens. Only a small fraction of the light passes through the filter, the lens being designed to leave most of the light for road illumination. An added advantage claimed for the amber upper ray is the ability to penetrate fog.

A focusing device is provided, designed to make it easy to adjust the position of the lamp filament. The glare preventing coloring of the upper beam portion does not depend on the adjustment, so that the color characteristic is preserved under all conditions by the filament adjustment. It is claimed also by the manufacturer that the difference in color between the two beam portions emphasizes the cut-off, thus making it more easy to check the level position of the lamp.

It is claimed that the light ray projected by the headlight conforms to the values given by the intensity and illumination of the beam at various points as defined in the specifications formulated by the Illuminating Engineering Society and the Society of Automotive Engineers. These standards of illumination have been adopted by ten Eastern states. The illustrations herewith show the comparison of the standard

requirements and the illumination at different points claimed for the E. & J. headlight.

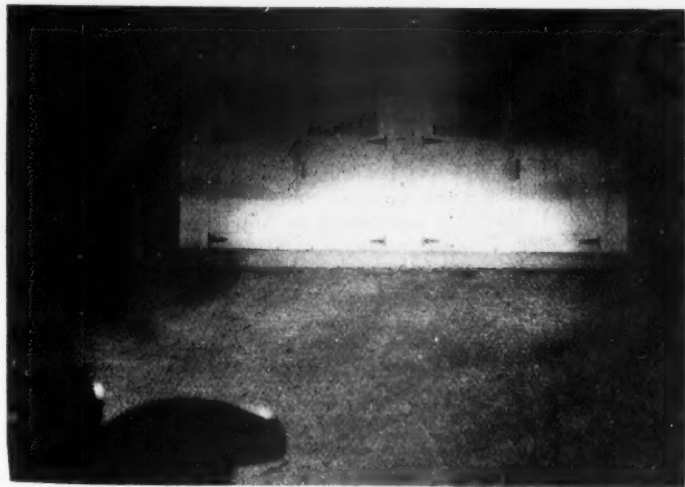
In the construction of the lamp, which is of egg-shaped form finished in black enamel with nickel lens rings and a 4 in. double strength lens, accessibility has been made a particular object. The body of the lamp, consisting of three parts, the body proper, the covering and lens rings are die-cast aluminum. The reflector is almost completely elliptical.

In the middle of the lamp, between the reflector and the lens, is a semi-circular glass filter of amber color. This color filter has a V-shaped notch in the top of the center. The flute in the condensing lens is the same angle degree as the V-notch in the amber filter to provide accurate diffusion. The source of light is a 21 cp. gas-filled bulb.

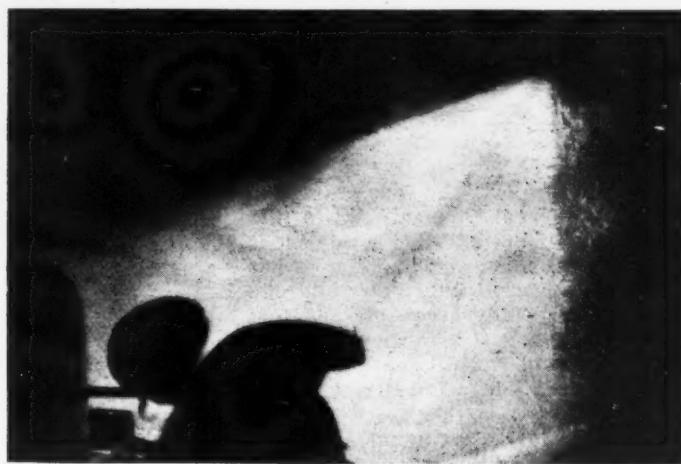
The elliptical reflector directs the light radiating from the incandescent lamp in such a way that the amber color filter cuts the ray at the apex or edge of its greatest intensity, throwing the most intense light straight ahead, while the rays reflecting upward are filtered through the amber glass to remove their glaring qualities.

It is claimed that this results in dividing the ray into two zones. The lower zone is a strong, white light providing illumination for 500 feet, and the upper zone an amber hue of sufficient illuminating power to disclose objects elevated above the level of the lamp.

The new headlights will be marketed through automobile dealers. The lamps will retail at \$50 a pair.



Pattern of new E. & J. light on door of garage. Note the V-notch at the center



Photograph of road illuminated by rays of new E. & J. type 20 headlight

Robert Bosch Combined Generator and Magneto Has Many Novel Features

Two Parts of Machine Independent as to Generation of Current and Failure of One Does Not Effect the Other. Magneto Portion Radical Departure from Previous Bosch Design

A NEW design of combined electric generator and ignition magneto has been developed by the Robert Bosch Magneto Co., Inc., and is being offered in three sizes, with generator outputs of 80, 100 and 130 watts, respectively. The largest unit gives its full output at a minimum speed of 450 r.p.m., while the two smaller ones require 600 r.p.m. In the generation of electric current the two parts of the machine are independent of each other, so that failure of the generator, for instance, does not affect the operation of the ignition magneto.

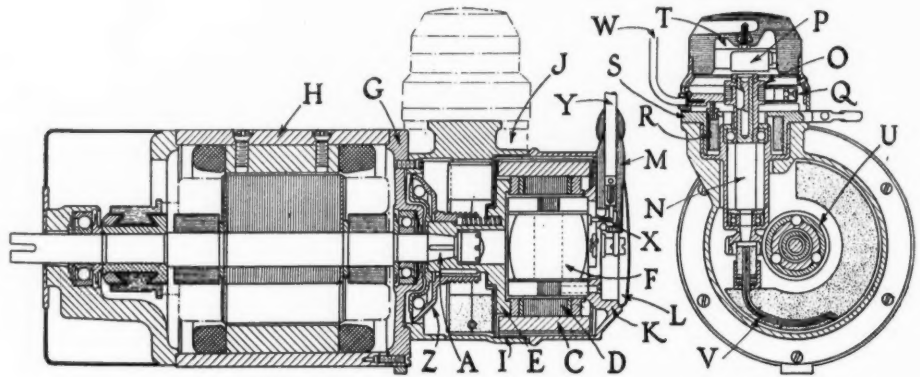
The generator has four poles and is shunt-wound. Its terminal voltage is maintained substantially constant by means of a regulating resistance, which is cut into and out of the field circuit by means of an electro-magnetic vibrator, whose coil is connected across the generator terminals. In its general features the generator portion of the new machine is quite similar to the separate generators for automotive purposes, built by Bosch at the present time, the only constructional difference being in the form of the bearing plate at the magneto end, which serves also for centering and mounting the magneto.

Magneto Part Different

On the other hand, the magneto portion of the machine is a radical departure from previous Bosch practice in magneto design. The magneto armature, which carries both a primary and a secondary winding, is stationary, while the magnetic frame, which is of similar form with two opposed poles, is arranged to rotate around it. The magneto field frame is mounted on the tapered end of the generator armature shaft, which obviates the need for separate bearings for the magneto and materially reduces the over-all length of the combination.

The interrupter and distributor are mounted on a common shaft, perpendicular to the axis of the rotating annular magnet. Motion is transmitted from the driving shaft to the distributor shaft through helical gears. One advantage of helical gears over the spur gears normally used for distributor drive is that they operate more silently; besides, it is claimed the arrangement here used has the advantages that interrupter and distributor are readily accessible and that it permits of a neat arrangement of the spark plug cables.

Referring to the sectional views herewith, on the tapered shaft end A of the generator is carried an annular permanent magnet C with two opposed pole shoes D to which is fitted a non-magnetic disc E. Within the pole shoes is ar-



Sectional view of the Robert Bosch combined generator and magneto.

ranged the stationary, shuttle-type armature F.

The housing of the magneto is in two parts. A bearing plate G, secured to the field frame H of the generator, serves for centering and fastening the magneto. To this bearing plate is fastened that part I of the magneto housing which carries the distributor mounting J. Part I also carries a part K to which the armature core is secured. At the outer end the magneto housing is closed by a sheet metal cover L and a hard rubber plate M.

Mounted in ball bearings in the distributor housing J is the vertical shaft N, which carries the interrupter cam O and distributor disc P. The stationary interrupter Q, with the condenser R, is located in a demountable annular housing S. On top, the distributor housing is closed by the flat dome-shaped distributor disc T, which is fastened to the distributor housing with a bayonet joint.

Shaft N of the interrupter and distributor is driven through a pair of helical gears, of which the driving gear U is mounted rigidly on the hub of the magneto field frame. Both gears are lubricated by means of a wick oiler V.

From the stationary armature the current is conducted to the interrupter, across the insulating plate M, through a cable W. The high tension current is taken off the stationary armature through the spring contact X and carried to the rotating distributor disc P by the cable Y. On the hard rubber plate M, there is a terminal for the connection of the switch cable.

Automatic or Hand Timing

Bosch combined generators and magnetos are made for automatic timing, hand timing, or both. Automatic timing is effected by means of a ball type of centrifugal governor which rotates the interrupter shaft relative to the annular field frame of the magneto. To this end

the driving helical gear is arranged so it can slide on the hub disk E. Connected to this gear is the ball disc Z of the centrifugal governor. With increase in speed the balls of the governor rotate the disk Z against the force of a spring. This causes the interrupter cam and the distributor disc to move ahead and ignition to take place earlier.

Automatic timing is said to be particularly advantageous with this design of magneto because it is possible to make the centrifugal governor very small, for the reason that it has to develop only slight forces, the mass of the interrupter cam and distributor disk being relatively small.

Rotated by Lever

For the purpose of hand timing, the interrupter housing S and the distributor head T are so arranged that they can be rotated through a certain angle relative to the interrupter shaft, by means of a lever secured to the interrupter housing. After loosening a clamp screw, the lever can be secured to the housing in any desired position, which takes care of different arrangements of the control linkage. The motion of the driving helical gear is limited by stops.

The total timing range of the magneto is 36 deg. of crankshaft motion. In case combined hand and automatic timing is used, one-half of the total range is controlled by hand and one-half automatically.

In the design of the interrupter, the movable masses have been held to very small dimensions and, therefore, are very light, so that the magneto operates faultlessly at very high speeds, it is claimed. The interrupter lever is not mounted on a stud but is supported by springs, hence bearing friction is eliminated, and the interrupter is said to be well protected against the ingress of oil.

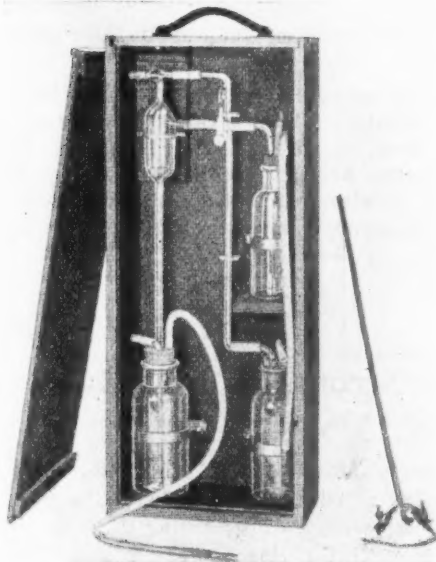
While the generator and magneto com-

bination is completely enclosed and all current carrying parts are protected against dirt and moisture, provision is made for ventilation of the magneto by vents in the interrupter housing. This obviates the condensation of water and oil vapors and the injurious formation of ozone.

Gear drive through a Bosch flexible coupling is recommended, at crankshaft speed for four-cylinder four-cycle engines and one and a half times crankshaft speed for six-cylinder, the magneto generating two sparks per revolution of its field frame.

The voltage and battery cutout switch are located within the generator housing at the commutator end, except in the 80-watt model, where they are on top of the generator at the same end, under cover. Both bearings of the generator and that in the distributor housing are of the ball type.

Exhaust Gas Analyzer Helps to Get Correct Air Gasoline Mixture



The apparatus is packed in a wooden box and may be easily transported

THE Fieldner-Jones quick gas analyzer is a rather simple device developed by the U. S. Bureau of Mines, to be used for analyzing the exhaust gases from internal combustion engines. It offers a ready means whereby a carburetor can be set or adjusted on a correct scientific basis. Only a few minutes are required to make a test and the apparatus can be operated by anyone.

The way the apparatus operates is as follows: The power from the engine is derived from the combustion from the cylinders of the air-gasoline mixture fed through the carburetor. The more completely the mixture is burned the greater the efficiency. The exhaust gas is made up of a complex mixture of various gases including carbon dioxide. When the mixture is well burned the carbon dioxide is relatively high and lower as the combustion and efficiency drops.

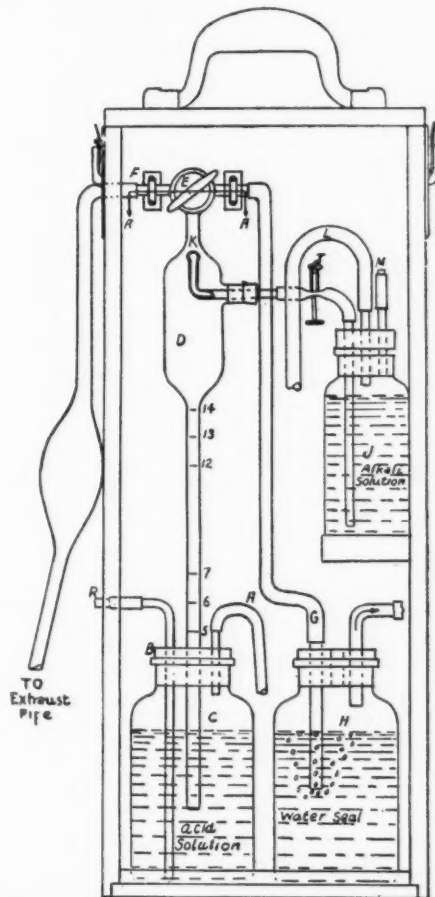
By measuring the carbon dioxide contents of the exhaust gases there is afforded means to determine how well the mixture is being burned. The Fieldner-Jones analyzer does this. After the test has been made the mixture may be enriched or made leaner till the carbon dioxide contents is correct. The correct mixture is obtained by referring to the table shown herewith.

The proper percentage of carbon dioxide for economy and maximum power varies with the fuel used and the type of engine. As a general rule 12.5 per cent of carbon dioxide is not too high and in some cases this may be increased to 13 per cent.

The complete apparatus is contained in a wooden case with sliding door. The case is equipped with a handle for carrying. Referring to the sectional view, D is the burette with the three-way valve E at the top and the side inlet K terminating inside in a small bulb with fine perforations. J contains a solution of alkaline, C contains an acid solution and A water.

The small of the gas is drawn into the burette D by means of the aspirator bulb supplied with each apparatus from the manifold or other gas source. The operator then blows into tube L forcing a spray of caustic solution into the burette. When this is done several times the test is complete.

The caustic solution absorbs the carbon dioxide from the gas, the solution from C rises in the burette to take the place of the absorbed carbon dioxide



Sectional view of the Fieldner-Jones quick gas analyzer

gas and the reading is taken at the top of the solution in the burette. The bottle H serves as a water seal to prevent air from getting back into the sample, and a reservoir for the excess solution from C.

The cost of this apparatus is \$37.50. It is of special value, it is said, for service stations, car makers, garages, fleet owners, schools and colleges. It is made by the Burrell Technical Supply Co., Pittsburgh, Pa.

23 Years Ago This Week In MOTOR AGE

(From MOTOR AGE of February 27, 1901.)

Gasoline Ferry Bill Passes

NEW YORK, Feb. 23.—There is great rejoicing among the members of the Automobile Club of America at the gasoline ferry bill having finally passed the senate and the house and become a law by the president's signature.

Lectures to Chauffeurs

NEW YORK, Feb. 23.—Following last season's precedent, the Automobile Club of America will inaugurate on Tuesday evening another series of practical lectures. The first course provided for has to do with the care and handling of automobiles. J. A. Kingman of the Locomobile Co., of America, will start the ball rolling from the steam standpoint. C. J. Field, of the De Dion-Bouton Motorette Co., will take up gasoline vehicles, and will discuss electric carriages.

Benefit Derived from Shows

The late shows at Philadelphia furnished an example of what can be accomplished by shows. The press of that city gave space with almost prodigal liberality to the event. The papers realized that the automobile is the coming vehicle and helped to "push it along." The articles printed in the Philadelphia papers have been copied throughout the length and breadth of the land, thus attracting the attention of millions of people to the fact that the machines are now in marketable shape and building up a demand which will repay the cost of the show a hundred times.

Fisher Reports Dealer Interest in Chicago Show

Carl Fisher of Indianapolis, now on the road for the Mobile company, was in Chicago on Monday and has gone to New York. He tells the same story as other travelers about the coming of dealers and others from outside points to the Chicago show.

Novel Exhibit for Chicago Show

The Badger Brass Co. has arranged a novel exhibit for the Chicago show. It will be something never before attempted, and, for fear competitors may adopt it, the few who are aware of the plan have been sworn to secrecy.

Some Letters to the Editor

Champions Ford Parts Pricing and Discount System

To the Editor of MOTOR AGE:

We read MOTOR AGE with a lot of enjoyment, and we certainly want to commend it as being a lot of help to the garage man who will read it as we do.

There is lacking in your paper, however, a champion of the Ford idea of pricing out and cataloguing in plain methods the parts of the various cars and the granting of a reasonable discount by all manufacturers to the regular garage dealer at all points except those where the companies have a dealer, and in that case, of course, the legitimate dealer should handle all the business for the manufacturer he represents.

There are many car owners who could be sold on parts for their cars when the cars are in the repair shop, if the price which the parts cost could be quoted at the time.

It seems to us that there can be very little real objection to the placing of a parts price list in the hands of every legitimate garage and repair shop which is interested in serving all lines of cars, for the price of their asking for the same.

I feel certain that we have lost no less than \$1,000 in sales in the last twelve months that we could just as well have made had we been able to quote the customer a tentative price on such repair parts as he really was in need of.

Any effort that you may make in the way of bringing this to the attention of the manufacturers will certainly be highly appreciated by all live dealers who are earnestly seeking the business and associated profits from serving all makes of motor vehicle in an efficient way.

We make our shop pay handsomely and we are no doubt doing it by about the same method that others do, perhaps using some forms which are original, and we will be glad to submit these to you should you desire to look them over at any time.

The Motor Inn Garage,
Scott City, Kansas.

Reminiscences of Dan Canary

To the Editor of MOTOR AGE:

My acquaintance with Dan Canary began at one of the great Springfield (Mass.) Bicycle Club race meetings. That was probably 1883, a year or two before George M. Hendee, later of the Hendee Manufacturing Company, manufacturer of Indian motorcycles, became a world-famed figure by his racing ability at the same place. Dan was born December 22nd, 1865, at Meriden, Conn., and in the early '80s was becoming famous as the one-and-only performer up to that time of tricks on the high, or "ordinary" bicycle. Later he had imitators. Perhaps some were more clever, but for grade and "finish" Dan was unapproachable. Among the later performers were Harry Tufts of Boston, and Rex Smith of Washington, both of whom engaged in matches with Canary, and later still came Sid Black, now of the Cleveland Motor Car Company; Prince Wells, well known for 35 years as bicycle and automobile dealer at Louisville; Ralph Temple, who formed a partnership with Wells; Warren Wood of Chicago, Ritchie of Philadelphia, who made trick riding a profession, which he still follows and other as prominent whom I have forgotten.

Canary's first balancing experience came to him when, as an

A. D. T. messenger boy, he spent much of his time on the rear legs of a chair! In 1884, or thereabouts, he came to Chicago to compete with Wood, who was badly beaten. The referee was the late John O. Blake, manager of the John Wilkinson & Company's sporting goods house on Wabash avenue. Most of Dan's practicing was done on the broad sidewalk outside the Wilkinson store, to the amazement of passers-by, who eventually blocked the street. The match occurred at the Casino rink at 24th and State streets, owned by the Spaldings, in whose employ the ever-green "on the spot" F. Ed. Spooner, was then a clerk.

A year later Dan went to England and was a guest at the annual dinner of the Stanley Bicycle Club, the original holder of bicycle shows and therefore the grandparent of the automobile shows of today (which reminds me, by the way) that the first bicycle show in America was held at Industrial Hall, Philadelphia, which city, therefore, set the example which led up to the hundreds of automobile shows since held.) Dan's contribution to the evening's entertainment was a trick-riding performance on the dining table which caused him to become known all over Europe. His first engagement was at a Christmas pantomime at the then unprecedented salary of 40 pounds a week. He stayed abroad three or four years, busy practically all of the time.

On his return, he became associated with the Overman Wheel Company (the same Overman who later developed an hydraulic truck device and, I believe, the present Overman tire.) His later associations are better known. He operated one of the first taxicab businesses in Chicago and then a second-hand car sales room, his last appearance prior to his departure for Florida and California.

S. A. MILES.

Everyone Is Strong for Flat Rate

To the Editor of MOTOR AGE:

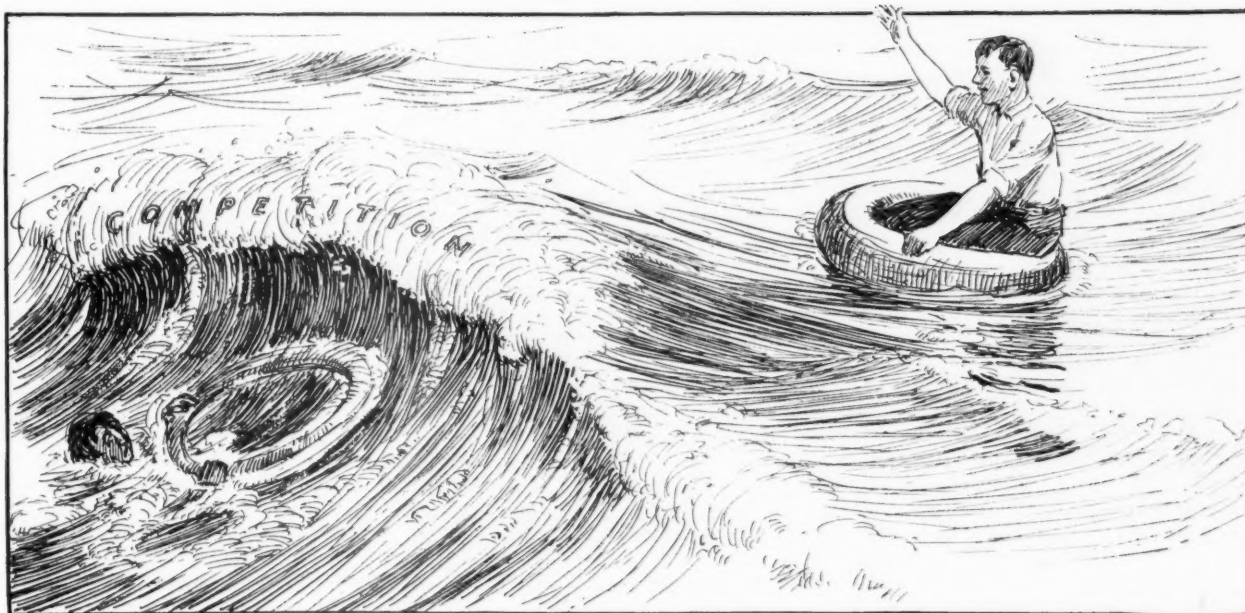
"We want to compliment MOTOR AGE on the great effort it is making in endeavoring to educate the trade to the possibilities of the flat rate system. We are causing quite a little comment by having inaugurated this system a short time ago. And it is needless to say that we are enthused, and feel that since installing it we are several jumps ahead of any repair shop in this section.

"We are running into a few obstacles, of course, but that is to be expected. The biggest thing has been that we have had little or no complaint on work put out under the flat rate system, either from the owner or mechanic. While we are not carrying all our men on the flat rate at the present time, we are endeavoring to advance them to this just as soon as work enough comes in to allow it.

"It might also interest you to know that our sales force is talking the flat rate system to prospective purchasers and showing them the advisability of having their cars taken care of under this method. And we have yet to hear of one who does not feel it is the only method under which to figure work of this kind. We have also read with interest Mr. Ikert's article in the last issue, especially the time study sheets, A and B.

"A plan is now being considered whereby regular meetings will be held to assist in further educating all employees connected with the firm, including the shop, sales and office force."

Morris Adler Co., Quincy, Ill.



What Balloon Tires Mean

*To the Dealer—Profit
To the Buyer—Comfort*

Public Demand for New Type of Tires Gives the Merchant an Opportunity to Get Away From Ruinous Cut Prices Which Have So Long Prevailed in the Business

In the following article the writer has brought together much available data on the various types of balloon or semi-balloon tires. He points out that the replacement market for the real balloon tire is limited because with them special wheels and rims are required. He tells about the balloon-type tires made for use on the standard wheels of many cars, at the same time making use of the low air pressure which gives comfort in riding. He discusses the effect of the large section tires on fender clearance and turning radius, and many other points.

WHAT'S it all about, this balloon tire stuff, and what does it mean? A gold mine? No, hardly; nor yet a get rich quick scheme—but to the wide awake dealer it is a real opportunity.

To the public it means comfort. The difference between a two dollar kitchen chair and one at a hundred dollars is not just ninety-eight dollars. That is mathematics but not business. The real difference is comfort plus pride.

In the balloon tire business the same factors, comfort and pride, will sell tires, but tires were sold before, and why is this a greater opportunity than was with us a year ago? Merely for this reason, that the folly of the cut rate artists has wrecked not only themselves but many higher class dealers as well, as far as appreciable profits from tire departments is concerned, for the public is used to paying but a small margin over the price that the dealer pays for his stock.

Whether the balloon tire craze is capitalized or wasted depends on **YOU**, on every tire merchant worthy of the name, for the car owner is willing to pay for comfort, to pay a

legitimate price for a legitimate piece of equipment, and because balloon tires are worth more to him, it is a chance to come back from the cut rate basis to a legitimate profitable basis that will keep the auctioneer from your doors.

What to Sell, That's the Question

Broadcast cross currents fill the air.

TIRE TIPS

BALLOON TIRES ARE HERE

BE THE FIRST
IN YOUR TOWN

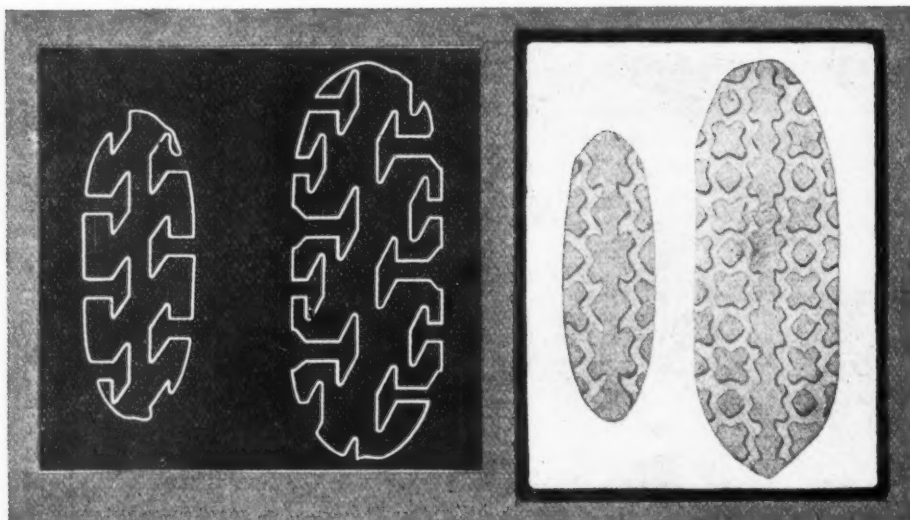
To Know Them
To Use Them
To Tell Others
To Sell Them
(INTELLIGENTLY)
AND
TO PROFIT BY
YOUR FORESIGHT

You tune in on a story of 20-inch rims and along comes interference from a station talking about semi-balloon types. Then you hear a bit about the difficulty of steering with balloon tires, when a loud voice from the advertising ether proclaims that steering is easier. Sanity seems to have vanished, but the confusion is temporary. Many changes will take place, but all agree that the balloon tire in some form is here to stay.

The Rule of the Yardstick

The chief bone of contention at present seems to be one of tire sizes and wheel sizes. All are agreed that a larger volume of air, produces greater results as to comfort. When the section of the tire is made larger, however, there are but two possible results. Either the outside dimensions of the tire must be greater or the rim and wheel must be smaller.

That gives us two obstacles. If the tire is larger it may hit the fenders and sides of the body, and if the wheels must be smaller, there is a question of how many owners are willing to pay the price for new wheels when the car itself may be low in market value. The reduced size of wheel is the answer without



Footprints on the sands of time. At the left in each case the mark of the cord tire. At the right the balloon tire leaves its trademark. Compare the areas

doubt as far as new cars are concerned, but it will be two or three years before a very great proportion of cars in use will be balloon equipped from this basis. That means either wheel changes on present cars or use of the oversize types which cut down fender clearance.

Use 'em Yourself

Not so long ago the fact was pointed out that dealers in winter, trying to sell non-skid chains, were doing so while their own cars stood outside of the showroom window, with no chains in use. This is not very good backing for your selling argument. In pushing balloon tires use 'em yourself. Get a set and try them out and you will know what you are talking about.

Owners are willing to listen to reliable information on this important subject and in talking the low pressure story it gives a chance to sell the prospect on your particular line of merchandise.

Balloon Tire Construction

The balloon tire is made with thin side walls, usually of four ply thickness, instead of six or eight plies. Strength, however, is gained by using more cords per inch and using cords of greater strength so that resistance to blow-out is not reduced. Impregnation of the cords in rubber before they are built into the tire is a process used by at least one manufacturer, which reduces internal friction to a great extent, thus preventing heating and breaking of the walls. The lower pressure permissible is made possible because of the greater flexibility of the side walls and the greater supporting surface in contact with the road.

The low pressure used accounts for the greater comfort obtained, but at the same time gives greater resiliency or springiness, which gives greater rebound to the car after going over a pronounced obstruction. For this reason best results are obtained if some sort of rebound check or snubber is employed in connection with the use of balloon tires.

Increased contact with the ground gives greater traction so that less power is lost due to wheels slipping when start-

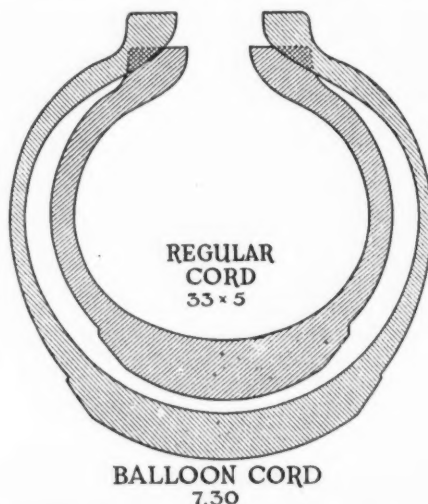
ing. The increased traction also makes brakes more effective, for the tire grips the ground instead of touching it over a small area, and this same condition reduces the chance of skidding.

Offsetting the additional cost of balloon equipment is the saving that is bound to result due to less jarring of the chassis and reduced tendency for the nuts and bolts to loosen up. This should result in fewer trips to the shop to have fenders tightened and rattles eliminated.

Effect on Steering

One disadvantage claimed against the balloon tire is increased difficulty in steering. This is most noticeable when trying to park the car in a narrow space where considerable turning of the wheels is necessary. The large contact of the tire with the ground puts a drag on the wheel, which must be eventually overcome with improvement in steering gears. At low speed, some difficulty in turning the wheel is similarly noticed, but in spite of these conditions users of these tires say they would never go back to the other kind.

High speed steering is satisfactory until it is found that on some cars a sort of shimmy or wobble develops. This,



Comparative sections of tires for the same car

however, is doubtless due to inherent defects in the design of the steering mechanism, which would be equally noticeable in ordinary tires if underinflated and run at high speed.

In rounding a curve at high speed, the car is felt to sway somewhat like an interurban electric car rounding a curve, this being due to the flexure in the walls of the tire, which allows the whole car to swing slightly to one side, using the tires as a sort of flexible pivot. This action, however, is not noticed after one becomes accustomed to the action of balloon equipment.

The mileage obtainable from balloon tires is about the same as the mileage obtainable with other tires. This is affected to a great extent by the care given the tires. Inflation should be maintained in accordance with the load, for underinflation will harm the balloon tire as well as any other type. In selling balloon tires a low pressure gage should be included, for satisfaction will not be possible if tires are not kept properly inflated.

Gasoline mileage has been reported both as better and worse than with conventional tires. Increased road friction would seem to increase the amount of gasoline consumed while on the other hand reduced internal friction should make the car travel easier. It is also true that where frequent starts are made, there is a saving due to reduction of wheel slippage. Racing of the engine is also prevented when running over rough roads, for the tires hug the road instead of merely hitting the high spots.

In the matter of safety from puncture it might be thought that with the increased area in contact with the road more nails and glass would be picked up, but on the other hand the softer contact does not seem to invite puncture as much as was the case with the higher pressures. As an illustration of this fact we might cite the case of cutting a string, where the string is always stretched tightly to make it possible for the knife to do its work. In the same way the balloon tire surface will recede so easily that sharp projections do not easily damage the surface.

On balloon type tires where the old rims are used, the objection has been advanced that the increase in tire diameter would change the effective gear ratio between the engine and wheel and therefore affect the operation of the car. The variation is slight, however, for the softer tire flattens out more where it makes contact with the ground, so that the distance of the center of the axle from the ground, and hence the gear ratio is not materially changed.

Precautions to Take

Interference with brake rods, brake drums and bands, fenders, body and steering arm is likely to be encountered and a study of the car should be made before an attempt is made to apply the balloon tires to it. This means that the make and number of cars in the dealer's territory should be carefully studied before tires are stocked, for it might be

found that the shelves had been filled with the wrong kind.

If the larger, more expensive cars are found in considerable numbers it may be well to figure on the full balloon tire which requires the special wheels and rims. Here the Motor AGE specification tables will give much assistance in determining wheel sizes. The next step would be to confer with tire and rim distributors in your territory and find out what they have available. The question of stocking tires and wheels will be a matter of judgment, for the merchant will have to determine whether it is best to put much material in stock or whether it is best to have a set on his car and take orders from the demonstrations he is able to make.

In the smaller establishments the latter method might be the safer, although quick service cannot be given in this way.

One of the large tire makers is prepared to furnish sets of tires together with special tubes, wheels, rims, spare rim, tire carrier and low pressure gage. Other tire companies furnish the tires only and recommend certain wheels.

For the Small and Cheaper Cars

While the car-using public is excited about balloon tires, it may be found that they are conservative as well, and that the excitement is more of the tongue than the pocketbook. Some of the owners of small cars may feel like having entirely new equipment while others will not feel like discarding their present tires. This means that there is a possibility of selling the semi-balloon or balloon type tire, which is designed to go on the present rims. The 31x4.4 size, for example, is made for Ford, Chevrolet, Gray and Star, and requires no change except that in the case of the Ford car most of the makers recommend changing from clincher to straight side rims, while one maker supplies the balloon type for clincher rims.

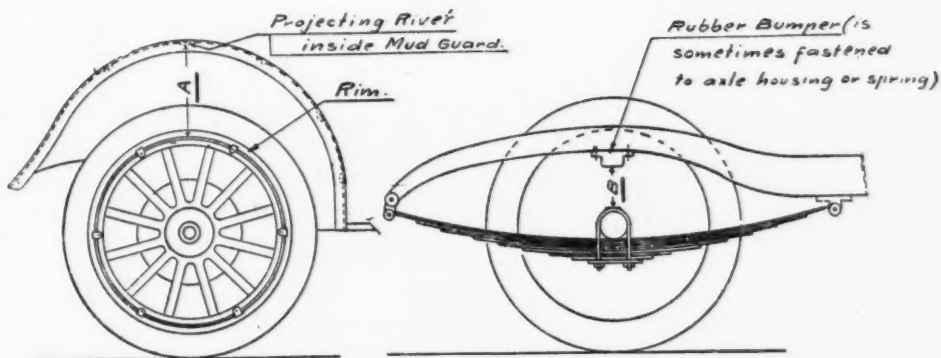
Replacement Data

The following data will be helpful in selecting balloon type tires for regular size wheels:

Car.	Present Tire Size.	Replacement Balloon Size.
Ford	30x3½	31x4.4
Maxwell	31x4	32x4.95
Dodge	32x4	33x4.95
Jordan	32x4½	33x5.77
Packard Six	33x4½	34x5.77

In the case of Ford cars special straight side rims will be needed unless clincher tires are used.

In figuring on balloon type tires the fender clearance should be checked as shown at "A" in one of the illustrations. The distance "B" in the same illustration should also be measured. Suppose, for example, that "A" is 12 inches and that "B" is 4 inches. This means a clearance of 8 inches for the tire when the spring is deflected the greatest possible amount. With the largest tire in the above table, which is 5.77 inches in section, it would give a net clearance of about two inches, which would be suffi-

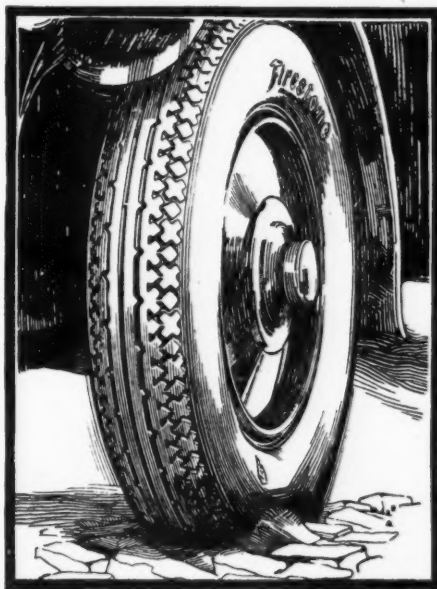


The difference between "A" and "B" gives the space for the tire. This should be about two inches more than the tire section

cient. An inch and a half net clearance figured in this way should be the minimum. Greater clearance may be secured by means of block type rubber bumpers applied so as to limit spring deflection. Then if the spring action is not sufficient, new springs with more curvature can be used, or the old ones re-arched by some spring company.

In addition to checking the clearance above the tire, the clearance at the side should be checked to see that there is room to allow for body side sway in rounding a corner. When turning a corner to the left, the rear of the left front tire turns in toward the frame and may strike it or the steering arm. On some cars a set screw is provided for limiting the turning angle so that the tire cannot strike. In using larger section tires it is desirable if possible to change such adjustment so that interference of the tire and frame will be avoided in turning.

At the rear axle it may be found that there is interference with brake rods and in the case of the smaller size wheels, the brake bands may cause trouble. This is sometimes overcome by using spacers which move the wheels outward, thus increasing the tread somewhat. Some of the tire concerns are able to supply spacers for this purpose.



The balloon tire yields before obstructions which might break or chafe the carcass of the ordinary tire

Balloon Tire Sizes

The real balloon tires are always mounted on the smaller wheels, and for this reason a table showing sizes to use should prove helpful. Data on typical cars is as follows:

Car.	Present Tire Size.	New Tire Size.	Rim Section.	New Final Diam.	Actual side diam.
Ford	30x3½	21	4.4	29.8	30.32
Maxwell	31x4	21	5.25	31.5	32.25
Dodge	32x4	21	5.25	31.5	32.25
Jordan	32x4½	20	6.20	32.4	33.25
Packard 6	33x4½	20	6.20	32.4	33.25
Cadillac	33x5	20	7.30	34.6	35.25

In the above table it would seem as if the actual outside diameter had been considerably increased in some cases, even with the smaller rims as compared with the former tire size. This is to some extent true, but it must be remembered that a tire size of 33x5, for example, does not mean that the outside diameter is exactly 33 inches. This was about the case when we had the old fabric tires with plain treads, but with the cord tires the increase over the nominal size was already considerable.

A fair comparison of the increase may be made by comparing the columns of present tire sizes with the new nominal outside diameter, for both of these will be increased somewhat by the amount of the tread rubber. This means in the Ford size only .2-inch difference, or practically the same size. In the Maxwell the diameter is about .5-inch greater, or ¼-inch difference in fender clearance. In similar way the other sizes can be compared.

Balloon Tires for Heavier Cars

In some cases certain sedan models will be considerably heavier than the regular touring models. To make these cars ride properly without heavily inflating the balloon tires requires that the next larger size be used. For example, with the Dodge car where a 5.25 tire would be used on a 21-inch rim a 6.20 section would give better riding qualities and the 20-inch rim should be used to keep from having too large an outside diameter. In similar manner the heavier Packard models would take tires of 7.30 section instead of the 6.20 size.

Air Pressure to Use

The proper air pressure depends on the section of the tire and the weight on the wheel and should be carefully determined. (Continued on page 25)

Making August the Busiest Month Through Sales Promotion

Establishment of Night School Has Helped the Studebaker Sales Branch at Cleveland to Greatly Increase Its Business. Part Time Salesmen Include Four Policemen

FOUND! By the Studebaker Sales Branch at Cleveland, Ohio, a sales promotion system that is given credit by officials of the agency for being the prime factor in accomplishing these things:

Converting August, ordinarily the dulllest and quietest month in the entire year, into the busiest and best month, from the standpoint of sales, of 1923—a year that has gone down as a banner one in the industry;

Enabling Studebaker to sell and deliver during August three times as many cars as were delivered by its closest competitor in Cleveland;

Giving the home office for Cleveland and fifteen branch Studebaker agencies an adequate force of competent salesmen—something that bothered the agency before last August;

Creating a good will for Studebaker cars in Cleveland that will last for many years.

The Night School Does It

The three weeks' night school, which was started by the agency last August, is the factor that is given a large share of the credit for revolutionizing Studebaker sales in August; for giving the agencies the salesmen needed to go out and sell Studebaker cars and for outstripping that competitor, who has had the faculty of making things interesting.

Since the night school was established there have been graduated 468 salesmen, of whom 80 are today working full time in the home Cleveland agency or in the fifteen branches. Then there are 318 working part time and looking forward to the day when they will feel free to quit their present positions and become full time Studebaker men. This means that of the 468, who graduated, 398 are still in the Studebaker organization.

"Every last man and woman of the crowd is a Studebaker booster and is sold thoroughly on the car, and they have a broadcasting value that alone is worth the time and efforts that were put into the night school," says Stan E. Comstock, retail salesmanager.

How Part Time Salesmen Are Paid

These part time salesmen are paid a commission of 4 per cent if they make the sale outright. If they bring the prospect into the agency and get the assistance of a full time salesman in selling they get 3 per cent commission and the full time salesman gets one per cent. If the full time man has to go out or has to make a demonstration in order to close the sale, then the four per cent

commission is split 50-50 by the full and part time salesmen working on the prospect.

At the end of the three weeks' instruction in the night school, the part time salesman gets a badge, which he wears continually. When he steps into an agency with a prospect, he either goes up to a car and starts his sales talk with the prospect if he has the confidence in himself, or he goes up to a full time salesman, displays his badge and the full time man then gets in his talk to both.

In this list of men and women working part time there are a dozen young attorneys; fourteen secretaries to business men and manufacturers; several engineers; store clerks, four policemen, several members of the city fire department and a few mechanics, in addition to housewives and club women.

Efforts of Salesmen Widespread

In short these graduates touch and tap about every field that is to be found in Cleveland. There are women, Studebaker salesmen, who attend the women's club meetings, and skillfully turn the conversation into automobiles, in the course of which chance remarks give the saleswomen tips about what woman is disgusted with her present car; what wants to give up the open car for a closed model, etc. In the lawyer's office similar tips are obtained, and so on through the list.

These part time people are given special tips on how to stir up prospects. A clerk for the Cleveland Electrical Illuminating Co., who is on the part time role, stirred up fifty prospects, by placing cards in parked cars in which notice was given that the car in so many days would depreciate so much in value and so much more depreciation would take place in an additional length of time, if it was not traded in right now at the highest value it ever will have.

The instruction on how to get tips includes going after the new car owner when he is proud of the new machine and is likely to brag about it to his neighbors and friends. Go into a cigar store or other place and after making a purchase ask about business. Then tell the proprietor that your business never was better. The proprietor or clerk will then ask what you are doing. It is not long until he will tell you that so and so was in the store and talked about buying a car. Other places for stirring up prospects, includes garages, especially where repairs are made, canvass of a neighborhood, liberal use of friends and acquaintances.

Course of Study in the Studebaker School

First Monday Night

History of Studebaker Corporation.
Sales Talk—"Removing the Mystery from Salesmanship," N. J. Crone.

Intermission.

Sales Address, Stan E. Comstock, retail salesmanager.

First Wednesday Night

What Your Motive Is and Should Be.
Examination on History of the Studebaker Corporation.

Specifications of Light Six Touring Car.

Service Policy on New Cars.

Intermission.

Appraising Used Cars.

Sales Talk "The Pyramid of Trade," N. J. Crone, assistant retail salesmanager.

First Friday Night

Examination of Light Six Touring Car.

Specifications on Special Six Touring Car.

Mock Sale.

Intermission.

Examination after Mock Sale.

Second Monday Night

Examination on Special Six.

Specifications of Big Six.

Mock Sale of Special Big Six.

Intermission.

Sales Talk—Stan E. Comstock.

Second Wednesday Night

Examination on Big Six.

Buying Used Cars—E. C. Hodge, Used Car Manager.

Intermission.

Mock Sale of Big Six.

Second Friday Night

Special Subjects.

Sales Talk "Mental Law of Sales," N. J. Crone.

Intermission.

Oral Examination on three Studebaker models.

Mock sales between part and full time salesmen.

Third Monday Night

Explanation regarding how the following should be filled out:

A Prospect Notification Card.

B Retail Sales Order-New Car.

C Used Car Sales Order.

D Purchasers' Statement.

E Bill of Sale.

F Sworn Statement.

Intermission.

Third Wednesday Night

Service Policy and Visit to and Inspection of Service Station.

Third Friday Night

Oral Examination on Big Six, Special Six and Light Six.

Cross Examination on Prospects.

Intermission.

Sales Talk on The Go-Getters, by N. J. Crone.

Reason for Night School Success

Night schools have been tried by many agents in Cleveland with but varying result. Comstock stated that he attributed the extraordinary results of this school to the following principles:

The agency actually places it within the power of the student to earn money, while taking the course.

Inspirational methods are adopted to stir up and to retain the interest of the students, such as the staging of mock sales, inspection of all Studebaker models and the service stations.

The driving away of Fear and the instillation of confidence in the students.

The whole course of three weeks is thorough and pointed toward thoroughly selling the student on the Studebaker car.

The fact that 398 of the students graduated are still interested in the work is sufficient evidence of the success of the school but the fact that 125 men and women sat through August, with the thermometer around the 90 point most of the time, and received instruction while others were seeking comfort outdoors in parks and in the lake, created an ineradicable impression on the minds of Studebaker officials.

Salesmen Not Born, But Trained

The curriculum has been worked out with a view to producing lasting effects. On the first Monday night, the students are given a history of Studebaker corporation and then E. J. Crone tells them that salesmen are not born, but are trained. True, he says in his lecture, some men know that they have the ability to go out and sell goods. They know they have the gift of gab developed to the extra stage. But these men are sprinters and rely on their ability only when they feel their backs are up against the wall. The "born salesman" will go out and work like the devil for

a few days to pay the rent or the interest on obligations, then he is likely to loaf awhile. Nothing worries the "born salesman."

The man who is trained to be a salesman on the other hand follows instructions of men who have been through the game. By following instructions he makes a better record in the long run than the "born salesman." He works all the time, seeing prospects. If he has a good day today, he works harder tomorrow for he is worried by the idea that he may have a stretch of dull days. He does not have any inborn salesman-ship faculty to fall back on. He knows

This is the spirit that the Studebaker school at Cleveland instills in students:

I recognize no obstacle, countenance, no defeat and defy anything to break my will.

I am a seeker after truth, and a discoverer of facts.

I build by happiness and success upon my desire and will to attain them.

While some things may be impossible I achieve the impossible things. I am a Studebaker man.

that he must follow instructions and keep plugging. That makes him.

There is another talk on salesmanship by Stan Comstock and Mr. Psychology gets into action. It is impossible to give full detail of the three weeks' course of instruction. But the high lights are:

On the second night the students are given tips as to what their motives should be in going to the school. An examination is given on the previous night's lecture on History of the Studebaker corporation. Then follow talks on the specifications of the Light Six model

and the service policy of the agency. The appraising of used cars is explained by another lecturer.

In this talk the salesman is advised to use the shock system on a used car owner who wants too much for his model. That consists of flashing a page of newspaper advertisements of cars that can be bought for less. Then follows a series of questions which elicits the amount that the owner will take. That is communicated to the manager of the used car department, and that official works on the prospect.

Specifications of the Special Six and Big Six also are given. Several mock sales between full time salesmen, then between part time salesmen, with others representing sweethearts, wife, father and mother participating. This is done to get a line on what objections are offered generally when the family has to be sold on a car. The students are told how to fill out the necessary statements and documents when the car is sold and then comes the cross examination on prospects.

This latter move is undertaken to find out every objection that has held up a sales on a prospect turned in by a student. If the student answers he has not sold because the wife or husband is in the hospital, conditions are looked for to overcome the objection and are given to the student. The date of the release from the hospital is followed up.

Heads of Departments Participate

Comstock conducts a round table school in which students are turned out finished products every four days. It is a revised edition and shortened one of the three weeks' course.

In the series of lectures that are given the heads of all departments participate so that when the course is concluded the student is given a thorough knowledge of every department and the entire workings of the organization.

WHAT BALLOON TIRES MEAN

(Continued from page 23)

terminated. The tire user should also be told the right pressure to use and be supplied with a low pressure gage. Pressure data is as follows:

Air Pressure.	Wheel Loads			
	4.40/21	5.25/21	6.20/20	7.30/20
18 lbs.	.....	550	700	850
19 lbs.	400	.....	.....	900
20 lbs.	.....	600	750	950
21 lbs.	450	.....	800	1000
22 lbs.	.....	650	850	1050
23 lbs.	500	.....	.....	1100
24 lbs.	.....	700	900	1150
25 lbs.	.....	.....	950	1200
26 lbs.	550	750	.....	1250
27 lbs.	.....	.....	1000	1300
28 lbs.	600	800	1050	1350
29 lbs.	.....	850	.....	1400
30 lbs.	.....	.....	1100	.....
31 lbs.	650	900	1150	1450
32 lbs.	.....	.....	.....	1500
33 lbs.	700	950	1200	1550

34 lbs.	.....	.....	1250	1600
35 lbs.	.....	1000	1300	1650
36 lbs.	750	.....	.....	1700
38 lbs.	800	1050	1350	1800
40 lbs.	850	1100	1400	1900

[MOTOR AGE acknowledges assistance obtained from literature of the following concerns or in conference with their representatives: Firestone Tire and Rubber Co., Michelin Tire Co., Miller Rubber Co., Goodyear Tire and Rubber Co., Dayton Rubber Mfg. Co., Lee Tire and Rubber Co.]

TIPS FOR TAXPAYERS

The period for filing income-tax returns for the calendar year 1923 ends at midnight of March 15, 1924. Heavy penalties are provided by the revenue act for persons who fail or "willfully refuse" to make a return or pay the tax on time.

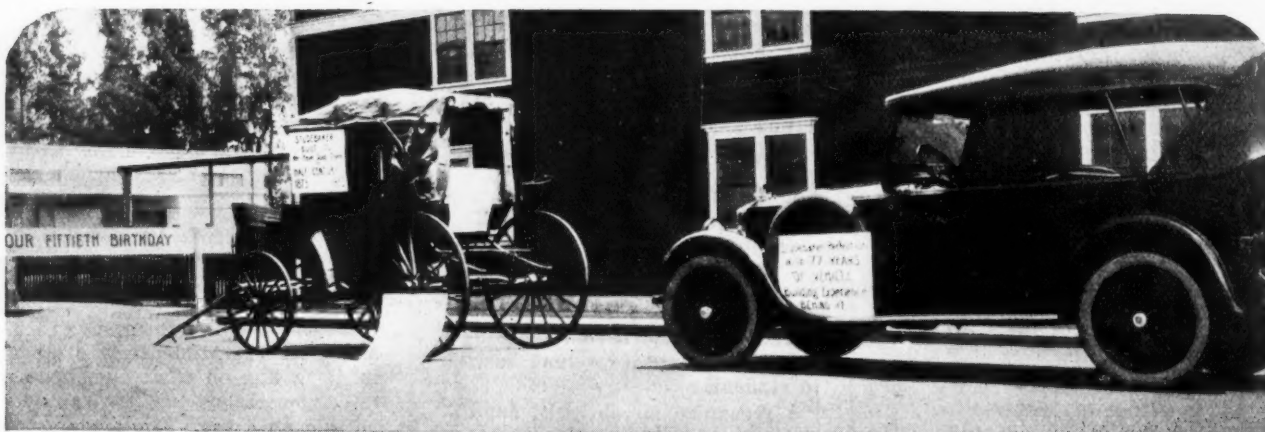
For failure to make a return a taxpayer becomes liable to a penalty of \$1,000, and a further penalty of 25 per

cent of the amount of the tax, unless a later return is filed and it is satisfactorily shown that the delinquency was due to a reasonable cause and not to willful neglect.

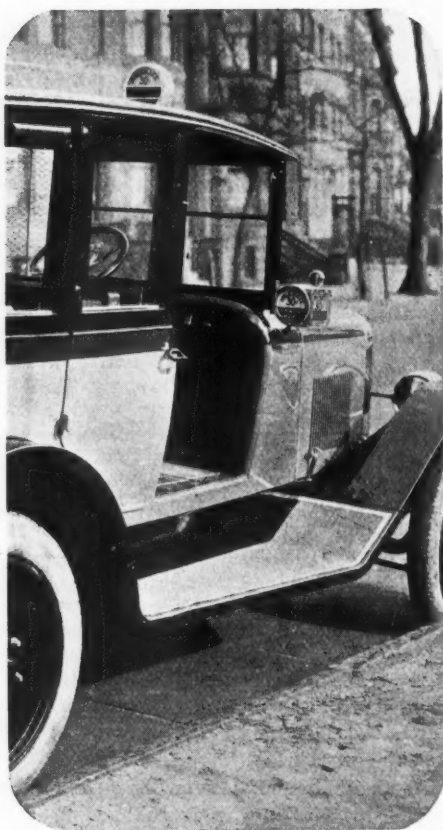
For willful refusal to make a return or pay the tax on time a taxpayer becomes liable to a penalty of \$10,000 or one year's imprisonment, or both, together with the cost of prosecution, and an added penalty of 25 per cent of the amount of the tax.

If in an income-tax return attempt is made to evade or defeat the tax, the offender is liable to imprisonment not exceeding one year and to a fine of not more than \$10,000 and costs, and, in addition, 50 per cent of the total tax evaded. If the understatement is due to negligence but without attempt to defraud, there is added 5 per cent of the total amount of the deficiency plus interest at the rate of 1 per cent a month until paid.

MOTOR AGE'S PICTURE PAGES



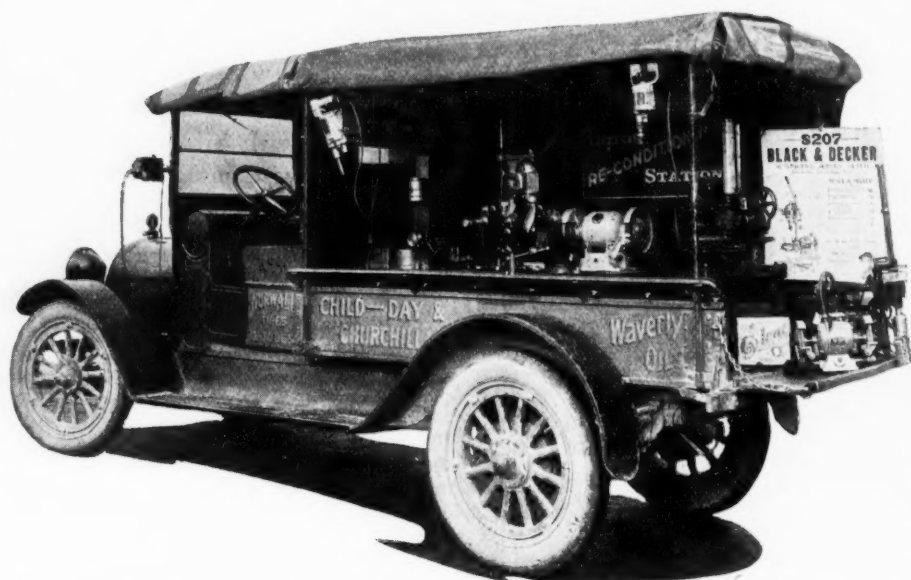
Progress on the job again. Volcano Stables and Transportation Co., Hilo, Hawaii, Studebaker dealers, parades that company's products of 1873 and 1923.



The taxi "Milerate." Before stepping in, one can see what portion of one's bankroll one will have to part with before one gets out. Kelsey Motor Co. is maker of this device.

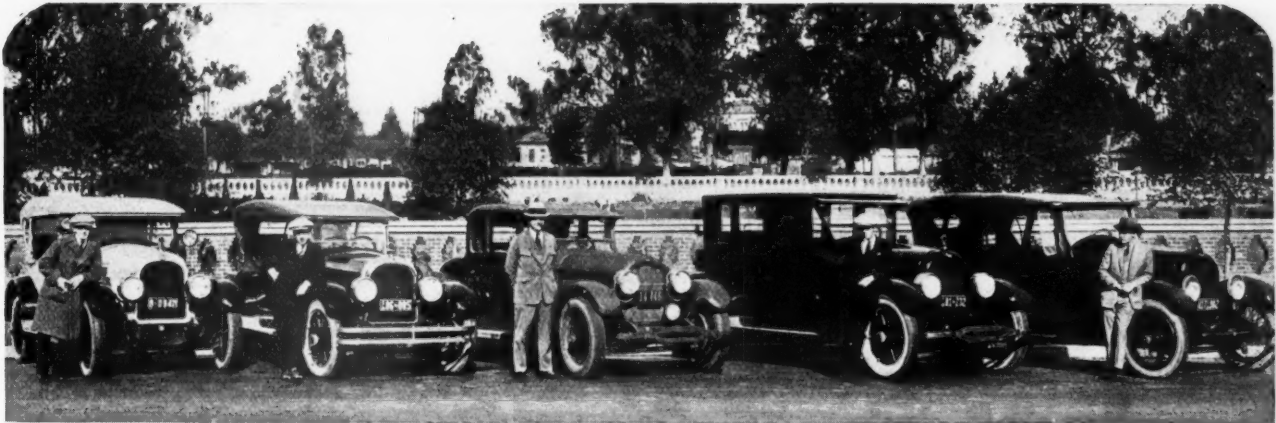


No stalling here. Truck and driver are kept on the job constantly by means of the trailer which provides new uses for the truck in stacking lumber and the like.

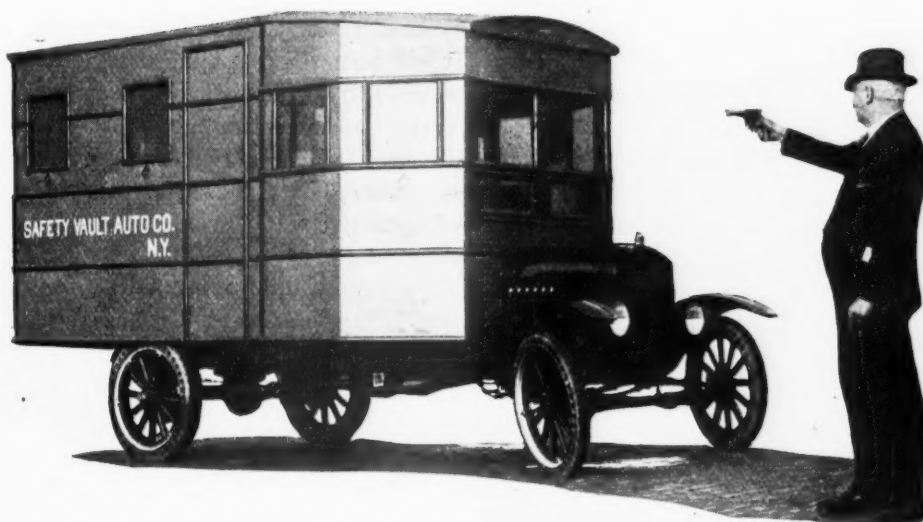


The reconditioning wagon. Bringing the hospital home, as it were, for, with this wagon, equipped with all tools necessary to overhaul jobs, Child, Day & Churchill, Inc., Spokane, can "do it anywhere."

OF AUTOMOTIVE INTEREST



Familiar names, these. Tommy Milton, Jimmy Murphy, Barney Oldfield, Eddie Hearne and Bennet Hill. Each man beside his Marmon car, singing its due praises.



This Ford withstands anything. Note the gent with the six shooter ready to crash the window, if he can. Transporting money is as hard a job these days as eating a club sandwich.



Almost took off—the driver's head. Running up wires is only one of the many accomplishments of the modern motor vehicle. It can run up bills, too.



FWD two-car gasoline train. Louisiana Southern Railroad tries out motor vehicle on 40 mile run from New Orleans to Shell Beach.

MOTOR AGE

Reg. U. S. Pat. Off.

Vol. XLV

Thursday, February 28, 1924

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 Warren Baker, Ass't News Editor
 D. M. McDonald, Detroit News

Home Office, 5 South Wabash Avenue, Chicago
 Cable Address Motage, Chicago
 Telephone Randolph, 6960

BRANCH OFFICES

New York City—U. P. C. Bldg., 239 West 39th St., Phone Pennsylvania 0080
 Detroit—7338 Woodward Avenue, Phone Empire 4890
 Cleveland—538-540 Guardian Bldg., Phone Main 6432
 Philadelphia—56th & Chestnut Sts., Phone Sherwood 1424
 Indianapolis—1212 Merchants Bank Bldg., Phone Circle 8426

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Make It a Pair

A GOOD argument to increase the sale of replacement springs is opened up by the letter of a shop proprietor to MOTOR AGE. This proprietor has found that almost invariably when he replaces a broken spring on one side of a car that side stands either higher or lower than the other side. This, of course, is due to a variation in the flexibility or dimensions of the spring. He wants to know who manufactures the springs used originally in all makes of cars because he believes that if he could buy replacement springs from these makers his trouble would be cured.

Theoretically this ought to be true. But manufacturers have no control over the use of a spring after it is put in the car. It is highly probable that springs of the very best quality will show changed characteristics after a year or two of use. This may be due to abuse, lack of proper lubrication or a number of other causes. In that case a fresh, new spring of like quality placed opposite the old one would be likely to show some difference in the level at which it would hold its side of the car. It is also probable that springs built by the manufacturer this year would be

so improved over the springs he made for the same car two years ago that there would be an inequality in their suspension characteristics.

In view of these probabilities it seems that the repair of a car with a broken spring could be more satisfactorily accomplished by the installation of a pair of new springs rather than only one. It should not be very hard to sell the owner on this idea when the reasons are pointed out to him and when the maintenance man works on a flat rate so that he can quote a price in advance.

Automobile Prices

FOLLOWING the national shows a number of automobile manufacturers have increased prices. The increases have been modest and have not applied to full lines, certain models being singled out for what appears to be a test of public attitude toward higher prices. Oldsmobile, the lowest priced six, has advanced from \$750 to \$795 for the touring car. Oakland, another General Motors unit, added \$50 to the touring car, making the price \$995. The corresponding models of Dodge Brothers has been advanced from \$880 to \$895. Studebaker increased certain open models, but left the enclosed models at the old prices. It will be noted that almost without exception the increases apply to open models, the demand for which will become greater as the spring advances. These changes also bring the open and closed model prices nearer together and make it easier to sell the enclosed types in competition with the open types. The factories now are better equipped to turn out enclosed cars than ever before in their history and if they can continue substantial production of this type throughout the spring and summer their production costs will be better proportioned.

It Pays

"IT pays to advertise."

That, everyone knows. But a question arises in our mind at this time, if it is paying a certain dealer whom we know, to spend the exorbitant amounts he must put into his advertising. Lately, he started a letter campaign, which, in the parlance of the day is a "wow." And that's about all it is. It falls flat, unless a person just reads the letter and does not go near the dealer's place of business.

The campaign makes a big noise, brings lots of people to the place but after one visit there is no advertising on earth that will bring them back, because this man is not equipped to meet the claims he makes in his ads. He has been doing this now, for six months. Six months more and he won't be able to do it. When you advertise, advertise what you know you have—then there'll be no kick-back.

The patent medicine house that advertises snake oil for curing every disease known to medical science and a few that were especially invented to give the oil an added

reason for being, can get away with it for a long time, because Barnum was right.

But with motor cars and motor car service, it's different "The long time" when dealers could get away with wild claims has passed. The few suckers that remain are so hard to find that it's a much better plan to do things right; then after a while, those few will disappear and with them, the dishonest merchant will go.

"It pays to advertise," all right but it pays far better to do as you advertise.

Saturation Point and Highways

SOME people will talk about a saturation point in the automobile industry.

Of course, if there were a fixed number of people on earth and they all had automobiles and none ever wore out, there would be a saturation point. It is possible that there will come a time when fewer automobiles can be sold than are absorbed today. Such a condition, if it comes, is likely to be only temporary. We observed such a condition only two years ago. The recovery from it was rapid. Now more cars than ever are being sold, and the roads are full.

There's the rub—the roads. If sales slow up you can lay it to lack of roads. If cars stand idle you are likely to find traffic conditions at fault. Highways we must have—and as far as mileage is concerned, we are already pretty well supplied.

But look at the width of the roads. Double track at the best. Few wider than that. Old horse and buggy type. They are inadequate. Roads must be wider. No use to build a narrow ribbon of concrete and expect two lines of traffic, one each way, to carry all the vehicles. Wider roads are absolutely essential and it is a waste of automobile owners' money to build them narrow.

Letters

"A MAN is known by the letters he writes". Your letters are your ambassadors—in them, the person addressed sees reflected, the institution of which you are the head. In them he reads your thoughts of him, your provisions for his service. He judges from them, the ability of your organization to meet his demands. If your letters are clear, well written, well constructed, and made to appear as personal messages, he will remember you for it.

Letters can be compared to a knife—a dull, dirty knife will do little more than make a slight imprint on even the softest piece of wood, while on hard wood, it will glance off leaving no trace of the contact. Your letters, if dull or untidy will make only a slight impression on the easiest kind of customer and, when encountering a "hard" customer, will be thrown away without the slightest thought.

A sharp knife will break any resistance and so will

a sharp, pointed letter. Make yours of the latter kind and you will see a big difference in the figures of the cash register.

Well Filled Shelves

AUTOMOTIVE accessory manufacturers in a round-table discussion recently remarked upon the tendency of jobbers to concentrate upon one line of merchandise in those fields which are covered by several practically duplicate or parallel lines. That is, if for instance there were several makes of brake lining of nearly equal quality and price covering the potential market with practically duplicate sizes and grades, the jobbers would stock and sell rather than half-heartedly take orders for any type the only one of these makes. By doing this he would be able to greatly reduce his investment in stock because if he handled all or several of the makes he would have to carry practically duplicate stocks of each in order to meet the requirements of his customers for various sizes and grades. The manufacturers declared that the jobber in this way reduces his cost of doing business and actually builds up his volume in the particular kind of merchandise because his salesmen are trained to SELL the goods they represent rather than half-heartedly take orders for any type the customer prefers. There is a lesson in this for the dealer who likes to keep his shelves filled with FRESH stocks of high-grade, dependable, salable merchandise.

One Big Owners' Organization

THE news that the American Automobile Association and the National Motorists' Association are to be consolidated is good news. The A.A.A. with its long record of usefulness to the American motorists has taken on new life and now shows a determination to be militant for the cause of the automobile, and the N.M.A., established at a time when its existence appeared to be necessary if organized motor clubs were to continue to function in behalf of their members, has contributed a high ideal of service to the car owner. The two as one can accomplish much more than both working separately could ever achieve.

Sell Your Service

SERVICE on an automobile in the minds of too many owners, means something to be had from the dealer free. Admitting that there are certain adjustments and corrections which the dealer should make without charge on a new car within a reasonable time after it is sold, the fact remains after a car is once put in operation it is subject to such wear in proportion to use that in order to continue in satisfactory and economical operation it must be maintained. Thus service becomes not a gratuitous adjunct to the sale of the car but MAINTENANCE to be paid for in compensation for mileage delivered.

Raise Output to Give Buyers Delivery

Automotive Factories Speed Up to Meet Spring Demand

First Part of February Shows Gain of 12 Per Cent Over January

NEW YORK, Feb. 25.—Reports from automobile producing centers for the first part of February show an increase in operations of 12 per cent over the same period in January and a much greater percentage of increase over a year ago. It is certain that there has been no curtailment of schedules since these reports were received and that as good a pace will be maintained through March. If total output for February does not reach the figures recorded in the best production months of last year it will be because of the fewer working days for factory activities.

Programs continue to be stepped up in plants which have not reached capacity, and conditions point to the probability that all major manufacturers will be running at top speed soon after March 1. Smaller plants are moving along at a high level, reflecting the current demand and the feeling that the coming spring will prove to be an exceptionally good selling season.

This feeling is based chiefly on the interest apparent at automobile shows. Enthusiasm on the part of both prospective buyers and dealers is marked, sales from the floor are being made in greater volume than heretofore and dealer orders are large. Only a few sections of the country are not responding to the appeal to the limit, due to local conditions which are likely to be improved before the spring season is well under way.

Despite the fact that shipments from factories to distributing centers against spring demand continue heavy, a feeling persists in some quarters that there will be a shortage of cars when the rush of buying commences. Producers have experienced no difficulty in making prompt shipments, rail facilities in January proving ample regardless of the heavy demand made on them. What surplus of freight cars that might have existed was absorbed by the industry during the month for the movement of automobiles.

The shipping situation is being watched closely to avoid any interruption to the flow of automotive products but there is no evidence at present that the railroads are not affording as satisfactory accommodations as they did last month. Driveways are keeping up, owing to open roads, although their volume has not been much greater than last year despite the much heavier shipments. More cars will be delivered over the roads when spring opens without any likelihood of much of an increase until then.

Truck production is wholesome, with

more vehicles being made and shipped and a wider demand reported. Bus output is increasing. As a result of the high operations in motor vehicle plants, allied branches of the industry are proceeding at a good rate. Parts makers are at capacity, for the most part, and see no prospects of slackening for some months.

To Be New Chief of Columbia Motors Co.



Lon R. Smith

FEDERAL TRUCK GAIN 173 PER CENT

DETROIT, Feb. 23.—The Federal Motor Truck Co. had an exceptionally good year in 1923, second only to 1919, whose record was closely approached by the net profits, before Federal taxes, of \$1,102,130, reported in the annual statement of last year's business. This profit is 173 per cent in excess of 1922. Federal taxes are estimated at \$110,000, not all of which is applicable to the year's earnings. This net after taxes is approximately \$1,000,000, equivalent to about \$5 a share on the 200,000 shares of \$10 par capital stock outstanding.

There was an increase of 56 per cent in sales volume in 1923, the total showing \$7,496,824, compared with \$4,810,587 in the preceding year.

TO SERVICE ORPHAN CARS

DETROIT, Feb. 23.—The General Parts Corp. has been organized in Flint to take over the service on cars whose manufacturers have gone out of business. L. H. Bridgman is president and general manager, Dallas E. Winslow, secretary and treasurer, and Frank Lay, vice-president.

The new company already is taking care of five lines of cars, including the Winton, Mitchell, Paterson, Crow-Elkhart and Liberty, and the Standard Axle Company.

Elect Lon R. Smith as Head of Columbia Motors Company

J. G. Bayerline Retires and Fred Wilson Succeeds D. J. Willoughby as Sales Manager

DETROIT, Feb. 22.—Lon R. Smith, widely known as a merchandising executive in the industry, has been elected president and general manager of the Columbia Motors Co., succeeding J. G. Bayerline, who has retired. The change in executives is understood to forecast a general change in the merchandising policies of the company which will come under the immediate direction of the president.

Associated with him in the affairs of Columbia will be Fred Wilson, who will take over the position of sales manager, succeeding D. J. Willoughby, who has resigned to take a position in the sales department of the Studebaker Corp. Mr. Smith and Mr. Wilson have been together in the firm of Smith & Wilson, Inc., of Indianapolis, marketing counsel for a number of important manufacturers specializing in automotive merchandising.

T. E. Barthell Is to Be Secretary and Treasurer

The appointment of the new president was made at a meeting of directors this week, which also acted upon the resignation of Mr. Bayerline, which had been pending for some time. Mr. Smith assumed the duties of the position at once and will be joined by Mr. Wilson before March 1. At the same time T. E. Barthell, who has been secretary of the company, was named treasurer, combining the two offices. Mr. Bayerline, following his resignation, is planning a vacation trip which will take him to Florida for several months and will later take a trip abroad.

Plans of the company under the new administration are understood to contemplate the establishment of a limited number of models upon which it will concentrate its production and sales effort. These will be all under the Columbia name. Servicing of the former Liberty line, taken over at the time of the sale of the Liberty company to Columbia, has been sold to the General Parts Corp. of Flint.

Mr. Smith is known in the industry for his connection with the merchandising of the Buda engine and later with the Midwest Engine Co. Previous to that he was with the Eisemann Magneto Co. Up to his acceptance of Columbia presidency he was president of the Smith-Wilson Company. His associate, Mr. Wilson, was previously sales manager of Stutz Motor Car Co., and had also been connected with the Midwest company.

American Automobile Assn. and the N. M. A. Join Forces

Consolidated Organization to Be Known as New A. A. A.; 700 Clubs Affected

WASHINGTON, D. C., Feb. 25.—Consolidation of the American Automobile Association, with the National Motorists Association, the two big national motoring organizations, was perfected here today and formally announced. The consolidation was perfected after a series of three meetings by officials of the two organizations and the new association will be known as the New American Automobile Association, composed of 700 clubs.

The way to consolidation was made easy in the beginning by a prompt and ready agreement to a proposal that the constitution and by-laws of both organizations be eliminated and a new one written, thereby forming a virtually brand new association.

The new constitution and by-laws, already written and approved, incorporated the best thoughts of the old, together with some valuable additions in keeping with the ever-changing conditions in the motoring world and the requirements of the individual car owners.

The governing board of the new organization will be an executive committee of seven members. It was unanimously agreed that Thomas P. Henry, of Detroit, who has been president of the A. A. A. since last May and who is credited largely with effecting the consolidation, shall continue at the head of the new organization. It was also unanimously agreed that Judge Walter D. Meals, of Cleveland who has been president of the N. M. A. since its formation two years ago, shall become chairman of the board of directors of the new organization.

Practically all of the men who held high honorary positions in both organizations will be chosen for high offices in the new association. Chief among these is Fred H. Caley of Cleveland, who was active in forming the N. M. A., and who has served as its executive secretary without salary for two years. Mr. Caley will probably become secretary of the new A. A. A. William Ullman, who for nearly eight years was secretary of the A. A. A. at Washington and editor of the American Motorist, and later publicity director of the N. M. A. will become publicity director of the new organization.

The negotiations which led to the consolidation were conducted by the following, acting for the executive boards of their respective organizations—representing the National Motorists Association: Judge Walter D. Meals and Fred H. Caley, of Cleveland; J. Borton Weeks, of Philadelphia; H. M. Lucius, of Baltimore; Henry L. Jost and Donald Latschaw, of Kansas City, and Alexander Johnson, of Louisville. Representing the American Automobile Association: Thomas P. Henry, Col. Sidney Waldon and William E. Metzger, of Detroit; Robert P. Hooper, of Philadelphia; Frank E.

Jack, of Chicago, and Major Roy F. Britton, of St. Louis.

FENGLER WINS BIG RACE

LOS ANGELES, Cal., Feb. 24.—Harlan Fengler won the national spring automobile championship race here today and established a world's record for 250 miles with his time 2:09:14 3-5. Fengler took the lead after the first lap and made it a non-stop race, averaging 116 miles an hour for the course. He drove a Wade special, also known as a Miller special.

Jerry Wonderlich of Bloomington, Ill., took second place in a Durant special. He averaged 115 miles an hour and his time was 2:10:20. Harry Hartz was third; time 3:10:49 4-5, average 114.4 miles an hour. Others placed as follows:

Benny Hill, Miller special, fourth; Tommy Milton, Miller special, fifth; Eddie Hearne, Durant, sixth; Jimmy Murphy, Miller, seventh; Earl Cooper, H. C. S. special, eighth; Joe Boyer, Duesenberg special, ninth; Cliff Durant, Durant special, tenth; Phil Shafer, Duesenberg special, eleventh.

JANUARY PRODUCTION GAINS

WASHINGTON, Feb. 26.—Revised production figures of the automobile industry show that the 186 actively engaged manufacturers in January produced a total of 316,093 passenger cars and trucks, compared with 243,539 in January 1923, and 91,272 manufactured in January 1922. For the entire year of 1923, revised figures of the U. S. Department of Commerce, show that the year's production of passenger cars was 3,636,767, as against 2,339,768 in 1922, while revised truck output totaled 376,106 in 1923, as against 246,281 in 1922.

IN BANKRUPTCY COURT

KANSAS CITY, Mo., Feb. 23.—The Kansas City Speedway Association, filed a schedule of net liabilities of \$617,249 and assets of \$526,740 in the federal court here today in connection with a bankruptcy petition. The valuation of the speedway, included in the assets, was placed at \$500,000. The major portion of the liabilities was listed as notes given for money advanced, work performed and materials obtained.

DODGE MAKING NEW MODELS

DETROIT, Feb. 21.—Dodge Brothers are now in production on the four new special models which were first announced and exhibited at the New York show. The four include roadster, touring, 4-pass. coupe and all steel body sedan priced at \$1,025, \$1,055, \$1,535 and \$1,545 respectively. With the new special line the Dodge Brothers group of passenger cars now includes ten types priced from \$865 to \$1,545.

YELLOW CABS FOR JAPAN

CHICAGO, Feb. 18.—Ryozo Yanagida, representing a group of Japanese capitalists, and T. Acki, engineer connected with the Imperial Commercial Museum, and Frank K. Shibata of San Francisco and Tokio, are in the country investigating motorized transportation systems, the plan being to abandon, for the most part, street car systems in rebuilding Tokio.

Gives Automobile to Every Congressman

WASHINGTON, D. C., Feb. 21.—Every U. S. Senator and Representative has been presented today with an automobile, the compliments of the American Automobile Association.

Unfortunately the shipment of vehicles arrived in broken condition, with the front left wheel of every car smashed.

The greeting tag with each one pointed out that the owner of the machine would not only lose time and the price of a new wheel by the mishap; but that he would have to pay the 5 per cent Federal Excise tax on repair parts as well, to cap his misfortune.

Investigation of this lavish presentation brought to light the fact that the automobiles were of the type which retail in the novelty stores at 10 cents each.

PREPARE FOR RECORD AIR FLIGHT

WASHINGTON, Feb. 23.—Complete supplies for the four United States Army aeroplanes which will attempt the first around-the-world flight from Seattle, on April 1, have been purchased and are now enroute to Calcutta, India, the War Department has announced. They include complete extra 450 h. p. Liberty motors and spare parts. Supplies, including extra motors, are being distributed at Prince Rupert, B. C.; along the southeastern coast of Alaska, the Aleutian Islands, and to various points in Japan.

The four officers and four mechanics selected to make the flight were the guests in Washington at a dinner given by Major General Hatsutaro Haraguchi, military attache of the Japanese Embassy, last Monday. They were presented to President Coolidge by Major General Mason M. Patrick, who congratulated them on being chosen to make the first around-the-world flight.

The officers are: Major Frederic L. Martin, commanding, of Chanute Field, Ill.; Lieut. Leigh Wade, Bolling Field; Lieut. L. H. Smith, Crissy Field, Cal., and Lieut. Eric Nelson, McCook Field, Ohio.

LIMIT RIM SIZE

NEW YORK, Feb. 21.—According to F. K. Starbird of the Firestone Tire & Rubber Co. who addressed Firestone tire and automobile dealers here last evening, the Firestone Tire & Rubber Co. is averse to the manufacture of balloon tires for existing standard 23 in. and larger size rims. For the present at least the manufacture of Firestone balloon tires for replacement purposes on cars not originally equipped with balloon tires will be confined to the following four sizes: 4.40/21, 5.25/21, 6.20/20, 7.30/20.

Instead of replacement balloon tires on existing rims, Firestone will offer what is termed "unit changeovers," consisting of 4 balloon tires, 4 tubes for same, 5 rims, 4 wood wheels, one extra band for car-rrier and a low pressure tire gage.

Tire Dealers of Omaha and Council Bluffs Form Assn.

New Body, Affiliated with the National Organization, Is Headed by Fred Rudisell

OMAHA, Feb. 21.—Organization of the Omaha and Council Bluffs Tire Dealers' Association was perfected at the Omaha Chamber of Commerce at a meeting last Saturday. Thomas F. Whitehead, vice-president of the National Tire Dealers' Association, and owner of three retail tire stores in Chicago, spoke.

Mr. Whitehead served as chairman of the meeting and directed the dealers in forming the new organization.

New officers elected were: Fred Rudisell, of the Rudisell Rubber Company, president; J. T. Wood, of the Rusch Tire Service, vice-president; L. J. Adler, of the Tire Service Company, Council Bluffs, secretary and treasurer. James E. Cronin of the Combination Tire Company and C. B. Adair of the Adair Rubber Company were chosen on the board of directors.

The new organization will be affiliated with the National Tire Dealers' Association.

TEST SHOWS BETTER GASOLINE

WASHINGTON, Feb. 23.—The quality of motor gasoline being purchased at the present time is estimated to be 20 per cent better than heretofore, as a result of greater skill and improved mechanical appliances now being employed by petroleum refiners, who are able to make cleaner cuts of gasoline and kerosene refined from crude oil, according to a survey made by the Bureau of Mines, Department of the Interior.

The survey covered New York, Washington, Pittsburgh, Chicago, New Orleans, St. Louis, Denver, Salt Lake City, San Francisco and Bartlettville, Okla. It was found that in all cities except St. Louis and Denver, the average of all gasoline samples tested came well within the range of federal specifications. In Denver and St. Louis the test showed that 74 out of 149 samples tested, or practically one half, failed to meet government motor gasoline specifications in some particular.

VESTA POSITION STRONGER

CHICAGO, Feb. 21.—Vesta Battery Corporation started 1924 free of unproductive incumbences, according to the annual report for 1923 made public here today. The company has discontinued its unprofitable branches and its generator business, and an inventory writeoff of \$88,600, it is declared, leaves it in a position to go ahead on a more satisfactory basis. The corporation effected a saving in overhead expenses of 21 per cent during the last half of 1923. The company's surplus was reduced \$212,000 during the year, the amount of the preferred dividend.

Springfield, Ill., Show a Success



SOUTHERN BUILDING BOOM

ATLANTA, Ga., Feb. 23.—January is believed to have been the largest month in the history of the automotive industry in the South in the number of new construction projects announced to be carried out the early part of this year, according to information compiled by a well-known financing firm in Atlanta and emanating from an entirely reliable source.

The total of such projects announced during the month exceeded 160, including new service stations, garages and automobile sales buildings, and new companies formed in the automotive field in the various southern states. The year 1923 was the largest year in this regard the industry had ever enjoyed, but the average monthly record for the year was forty less than the January number as given above. The total investment involved in this construction amounts to several million dollars.

URGES U. S. GAS CONTROL

ATLANTA, Ga., Feb. 23.—Federal control of the gasoline industry, and its operation as a public utility, is advocated by George M. Napier, attorney general for Georgia, in a bitter attack on the industry made recently following several gasoline price increases in various sections of the state. Napier is a member of the special committee appointed by the national association of attorneys general to investigate the numerous fluctuation in gasoline prices, and the recent statement regarding the industry was made during the course of his investigation of its operations in the state. The statement further declares that the increases in prices have been unwarranted, and responsibility is laid to the Standard Oil Co.

WOULD RESTRICT GARAGES

BALTIMORE, Md., Feb. 21.—An ordinance has been introduced in the Baltimore city council to prohibit public garages, automobile repair or welding shops, or the sale of gasoline or other motor fuel within 300 feet of a theater, motion picture house or other place of public meeting. It does not apply to places already established. A previous city council passed an ordinance applying to churches, orphanages and schools.

Lafayette Motors Reduces the Price on Its Models

MILWAUKEE, Wis., Feb. 25.—Reductions in price ranging from \$1,750 to \$2,500 have been announced by LaFayette Motors. The following table gives the old and new prices:

	Old	New
Touring car, 7 pass.....	\$5,000	\$3,250
Torpedo, 4 pass.....	5,000	3,250
Four-Door Coupe, 4 pass...	6,300	4,300
Sedan, 7 pass.....	6,500	4,400
Imperial Sedan, 5 pass.....	6,300	4,500
Limousine, 7 pass.....	6,500	4,000
Imperial Limousine, 7 pass.	6,750	4,700

These prices are now in effect.

DISCUSS STANDARDIZATION

WASHINGTON, Feb. 25.—Standardization of tools used in the automobile and other industries was taken up this week by Secretary of Commerce Hoover, in conference with a committee composed of 90 per cent of the manufacturers of forged tools in the United States. The preliminary survey shows that standardization may be effected on 426 types of tools, reducing the number to 363 types.

Included in the conference were H. P. Sheets, of Indianapolis, representing 23,000 retail hardware dealers; T. James Fernley, of Philadelphia, of the National Hardware Association; James A. Donnan, of Richmond, Va., of the Southern Hardware Association; Arthur B. Clunan, of New York, for the National Association of Purchasing Agents; the Champion Tool Company, of Meadville, Pa.; The Evansville Tool Works, of Evansville, Ind.; Heller Bros. Co., of Newark, N. J.; Hubbard & Co., Iron City Tool Works and Klein-Logan Co., of Pittsburgh; Fayette R. Plumb, of Philadelphia; Stanley Works, of New Britain, Conn.; the Warren Tool and Forge Co., of Warren, Ohio, and the Warwood Tool Co., of Wheeling, W. Va.

ROAMER MAKES CORRECTION

KALAMAZOO, Mich., Feb. 25.—The Roamer Motor Car Co. desires to correct the impression that it will concentrate on the production of Pennant taxicabs. While it will manufacture taxicabs, it is not the intention to abandon passenger cars and this branch of the business will receive as much attention as do the taxis. The company is planning for production on an increased scale in the near future.

Large Crowds at St. Louis Show Despite Bad Weather

Reports of Sales Indicate Far More Cars Were Sold Than Last Year

ST. LOUIS, Mo., Feb. 23.—Although the weather for the Seventeenth annual St. Louis automobile show, Feb. 17 to 23, was bad, the attendance ran close to 125,000 for the week, an increase of approximately 35 per cent over last year. Reports of sales indicate that there were far more cars sold at the show than last year. Buying interest was centered chiefly in closed models.

The show was held in the Columbia Can Co. building at 5137 Natural Bridge avenue. The displays occupied two floors. There were forty-five distributors and dealers of passenger cars exhibiting 56 makes of automobiles and ten truck dealers displaying eleven trucks and tractors, in addition to the accessory displays.

TO SURVEY FOREIGN TRADE FIELD

WASHINGTON, Feb. 23.—A survey of the foreign trade requirements of the American automobile manufacturers in the East will be made beginning this week, by Percy Owens, new chief of the Automotive Division of the United States Department of Commerce, who is making a personal visit to practically all of the leading automobile manufacturers in New York, Michigan and Ohio. The purpose of Mr. Owens' trip is to meet the executives of the automobile industry and to make a study, particularly of what the export managers want, from the United States Bureau of Foreign and Domestic Commerce.

"Unquestionably one of the most vital questions of the automobile industry at the present time is the development of foreign markets for both passenger cars and trucks," Mr. Owens said, "and the purpose of my ten-day trip is to learn first hand just how the Department of Commerce can best aid the automobile industry in the securing of this foreign business."

TO ABANDON MINNEAPOLIS PLANT

ROCKFORD, Ill., Feb. 23.—Tractor manufacture of the Emerson-Brantingham Company, will be discontinued at Minneapolis, Minn., about April 1. The capacity of the Minneapolis plant has been 5,000 tractors per annum. The company has sold its buildings and real estate in Minneapolis to the International Harvester Company, and will transfer the equipment and machinery to Rockford during the next three months. The transfer will concentrate manufacture at the home plant and handle the tractor department more economically.

URGE SALE TO FORD

WASHINGTON, Feb. 23.—The sale of Muscle Shoals to Henry Ford was urged upon Congress at the closing session this week of the National Board of Farm

Organizations, representing 800,000 farm families.

"It is the belief of our organization that Henry Ford will be able to do more for the farmer in the manufacture of fertilizer, than any other possible purchaser of the project, and for this reason we desire to go on record as favoring the automobile manufacturer's purchase of the project," the organization informed Congress in a resolution.

START A. E. A. ECONOMIC SURVEY

BOSTON, Feb. 23.—The survey on cost of doing business in the wholesale automotive equipment trade, conducted by the Harvard Bureau of Business Research for the A. E. A., has been begun. Forms have been sent to a list of representative jobbers asking for detailed facts about their business. The forms are not long, but will provide a wealth of vital information for every one connected with the parts and accessory business.

The wholesaler is asked, in addition to filling in a profit and loss statement, to tell specifically the lines of merchandise he handles; whether or not he operates a garage, service station, or taxi service; net inventories at beginning of year; amounts paid in salaries and wages; proportion of sales made at retail and wholesale; number of traveling salesmen employed; makes and sizes of tires and tubes carried; and a number of other questions of a similar character.

Each wholesaler submitting a report of his business will receive summary of the results of the investigations, but the details of specific reports will be held strictly confidential.

FLINT RAISES PRODUCTION

NEW YORK, Feb. 21.—Through the opening of the new Flint plant at Flint, the production of this unit of Durant Motors has been stepped up and now is reported 33 1-3 per cent since Dec. 1. Previous to that date the eastern plant at Long Island City was in quantity production, but the new plant at Flint was just entering that stage. The January increase in production over December was 17 per cent but a further increase in February has brought the total gain in production and sales to 33 1-3 per cent.

O. K. CASH BASIS PLAN

CHICAGO, Feb. 21.—The Chicago Garage Owners Association at its meeting Feb. 19, officially sanctioned the proposal to charge storage in advance and to put all garages in Chicago and Cook county, members of the association on a strictly cash basis. A committee of five was appointed to work out a plan for providing first aid to disabled cars.

RESTRICT BUS SPEED

MILWAUKEE, Wis., Feb. 25.—Busses must conform to the maximum speed limit of 20 miles per hour of trucks, according to a ruling handed down by the attorney general. Present schedules are based on a 30-mile limit.

Atlanta Hangs Up a Sales Record at Its Big Show

Georgia Dealers Are Successful In Disposing of Cars Valued at Nearly \$100,000

ATLANTA, Ga., Feb. 27.—Total sales on the floor of new cars aggregating nearly \$100,000 were reported by dealers of Atlanta exhibiting at the Fifth Southern Automobile Show, the largest record by far in the history of the show during the first four days, and more than equal to the total sales made at the show two years ago. Last year's sales exceeded \$150,000. Compilation of sales reports by dealers show a total of 54 new cars sold on the floor during the first two days of the show.

Dealer conventions held during the week included the southeastern Nash dealers, Studebaker, Buick, Packard, Oldsmobile, Ford, and Franklin.

WISCONSIN ASSOCIATION ELECTS

MILWAUKEE, Wis., Feb. 25.—New officers of the Wisconsin Automotive Electrical Association, elected at the annual meeting are as follows: President, Arthur L. Grede, head of the Federal Tire & Supply Co., Milwaukee; vice-president, Adolph Graner, president Wisconsin Magneto Co.; treasurer, Prof. E. L. Consoliver; secretary, Matt P. Kissinger; directors: Herman Schmidt, of Badger Storage Battery Co.; George W. Stauss, of Jefferson Oil Co.; Arthur Perlick, of Perlick Brass Co.; Michael Ert, retiring president and Williard representative; Charles Seifert, of Storage Battery Service Co.

BODY MAKER TO BUILD BOATS

RACINE, Wis., Feb. 25.—The Racine Mfg. Co., one of the largest manufacturers of enclosed bodies in the middle west, is about to embark upon a new line of production, namely, steel-hulled motor boats of the high speed type. It is reported that an arrangement has been effected with the Dodge interests by which a production of 5,000 to 10,000 craft a year will be marketed.

TO TEST MATERIALS

NEW YORK, Feb. 27.—The Automotive Service Association of New York has added a complete materials testing service to its equipment. Members of the association will be able in the future to submit to the laboratory oils, steel, aluminums, brake linings, spark plugs, carburetors, engines or anything else for any sort of a test they desire to have made.

REDUCE ROAD BUILDING COST

SPRINGFIELD, Ill., Feb. 23.—The Illinois state highway department, after an analysis of bids opened this winter, estimates that hard roads will be built this year at considerable less than \$30,000 a mile. Of 152 miles to be paved, bids were opened on 149 miles and the average was \$26,000, including cement.

Trade Associations to Seek Court Test of Right to Gather Statistics

WASHINGTON, Feb. 23.—A test case is being planned by certain trade associations to clear up the rights of such associations to gather statistics relative to their business, Attorney General Daugherty has announced. The Department of Justice, however, is withholding the name or names of the organizations who have informed the Department of their contemplated action in solving the mooted question as to whether or not such trade associations can or cannot legally gather statistics save at the request of the Department of Commerce.

Not until the courts definitely define the rights of such associations will any progress be made in perfecting and expanding the existing machinery for the scientific study of business, the associations have advised the Department of Commerce.

There are a number of cases pending before the courts involving the legality of gathering statistics by trade association. But they are all complicated by other questions, and particularly by the charge that such statistical organizations are devised for circulating agreements about prices. If the right of trade bodies to engage in legitimate statistical studies is to be tested, then a clear-cut

case, unmixed with these other issues, must be made. This is the reason for the test case which is proposed.

Without expressing an opinion as to the legal status of trade association activities, questioned in certain regards by Attorney General Daugherty, the Department of Commerce has announced it would continue to publish its monthly survey of current business in connection with which it has been receiving information and statistics from various associations.

The department will continue to request trade associations to furnish "such statistics as may be necessary or convenient for its purpose," the statement said.

Officials declare that the recent correspondence between Secretary Hoover and Attorney General Daugherty relative to the legality of the collection, compilation and distribution by trade associations of statistics of general information on business has caused widespread discussion. Secretary Hoover believes that barring of the collection and distribution of statistics by trade associations would be a severe blow to the small business men.

Gray Motors Corp. Advances Prices on Its Closed Models

DETROIT, Feb. 22.—The Gray Motors Corp. has advanced the prices of its closed models \$15 and \$20. The coupe and sedan now listing at \$750 and \$895 respectively.

Both the Standard and Sport Phaetons remain at \$630 and \$720. An advance of \$20 has also been made on the Commercial Chassis which now sells at \$595.

The following table shows the new schedule of prices:

	OLD	NEW
Phaeton	\$630	\$630
Sport Phaeton.....	720	720
Coupe	735	750
Sedan	875	895
Truck	575	595

JORDAN GIVES SALES ADVICE

BUFFALO, Feb. 23.—Edward S. Jordan, president of the Jordan Motor Car Company, in an address before the Buffalo chapter of the American Institute of Banking, described, in a humorous way, the human side of selling. There are, he said, four fundamentals necessary to attain success: the spirit to serve willingly and intelligently; knowledge of the job; the courage to overlook slurs and criticism, and honesty.

There are four fundamentals in the family that must be dealt with, he said. First, the father, whose keynote is economy; second, the mother who is ambitious for the future of her children; third, the daughter who seeks social prestige, and finally the son who wants

to be up and going. The father rules the family in the earlier estate, but in later years, when the daughter is grown up and rules the father, then the transition comes from the cheaper cars to the more expensive models. The successful automobile merchant takes advantage of that situation and directs his appeal accordingly.

RED CABS FOR CHICAGO

CHICAGO, Feb. 23.—At least 100 crimson colored taxicabs are to appear here on July 15, according to present plans of the Red Cab & Motor Co. Other cabs will be added to the fleet from week to week if the public reaction is favorable, declare officials of the company. Prices have been asked from the Yellow Cab Mfg. Co. Stations will be built in various parts of the city. The company has just bought a site on the southwest side of Elston Avenue on which a \$100,000 station for the northwest side will be erected.

NEW MARMON DISTRIBUTOR

CHICAGO, Feb. 21.—Smith Sauer Co., 2438 Michigan avenue, have taken over the distribution of the Marmon car in the Chicago territory which was recently discontinued by the C. E. Gambill Motor Co., which will continue the distribution of the Hupmobile and retail Chevrolet. Smith Sauer will handle the Marmon and Case which line it has distributed for years. A new service station has been opened at 2815 S. Wabash avenue.

A. A. A. to Cooperate in War on Glaring Lights

To Aid American Engineering Standards Committee to Keep Specifications Up to Date

WASHINGTON, Feb. 23.—An invitation has been extended to the American Automobile Association and accepted, for that organization to cooperate with the American Engineering Standards Committee in its war on headlight glare.

The A. A. A. has been asked to name a representative to serve on the sectional committee with the A. E. S. Committee, which is charged with the work of keeping the present tentative standard specifications for laboratory tests for approval of electric headlight devices for motor vehicles up to date. Major R. E. Carlson, an engineer of the U. S. Bureau of Standards, is the representative designated by President Thos. P. Henry, of the A. A. A. The Illuminating Engineering Society and the Society of Automotive Engineers are the joint sponsors for the work of the sectional committee.

The American Engineering Standards Committee in November, 1922, approved specifications for laboratory tests of automobile headlight devices which were prepared by the Illuminating Engineering Society. The list of headlight devices manufactured in the United States which conform to the specifications were approved by eleven states. In addition to working for the approval of standardized specifications by the various states, the American Automobile Association, through its affiliated clubs, has been carrying on an energetic campaign to have motorists check up on their headlights and have them properly adjusted, so that it will not be necessary to dim lights in approaching another vehicle at night. The sectional committee on approved headlight devices is as deeply interested in the proper adjustments as in the use of the proper device, as the elimination of the glare cannot be accomplished unless the proper lens is properly adjusted.

RENAULT CROSSES SAHARA

PARIS, Feb. 4.—(By mail)—Running day and night, a convoy of three Renault six-wheel automobiles has crossed the 1,200 miles of the Sahara desert from Colomb-Bechar in Southern Algeria to Bourem on the Niger in six days and is continuing down the river to British Nigeria. The cars were in charge of M. Gradis, one of the directors of the Transsaharien company and carried Lieuts. Rene and Georges Estienne, Engineer Schwob, of the Renault Company, and a number of mechanics. The route is one which was proposed by Lieut. Estienne, as the result of his explorations into the Sahara desert and proved to be faster and shorter than that followed by the first Citroen motor expedition across the desert.

Reorganize Oregon Assn.; Board More Representative

**Directorate to Number 14 Men
From 11 Districts Which
Comprise the State**

PORTLAND, Ore., Feb. 23.—Reorganization of the board of directors of the Oregon Automotive Trades Association, to make that organization more truly representative of the entire state than ever before, was accomplished at the annual meeting of the association held in Portland this week as one of the features of Automobile Show week.

Under the new arrangement the board is composed of 14 men from 11 districts into which the state was divided. The officers and directors of the association elected are as follows:

President, M. P. Cady, Hillsboro (re-elected); first vice-president, W. A. Gill, Portland; second vice-president, Otto K. Paulus, Salem; secretary-treasurer, Ralph J. Staehli, Portland; directors, J. H. Alfred, A. H. Brown, V. C. Unden and F. R. Wiggins of Portland; R. B. Miller, Tillamook; Gilbert Tilbury, McMinnville; W. E. Burns, Salem; F. L. Hathaway, Eugene; James Riley, Medford; L. H. Pearce, Myrtle Point; Walter Coombs, Bend; Robert F. Simpson, Pendleton; R. C. Frisbie, Baker; H. L. Fancher, The Dalles.

The meeting of the association followed a luncheon tendered by the Portland Automobile Dealers' Association at which about 300 were present. Among the visitors were F. L. Klingensmith, president of the Gray Motor Corporation of Detroit; Eddie Rickenbacker, of the Rickenbacker Motor Company of Detroit, and C. P. Clark, newly appointed Pacific coast representative for the National Automobile Chamber of Commerce.

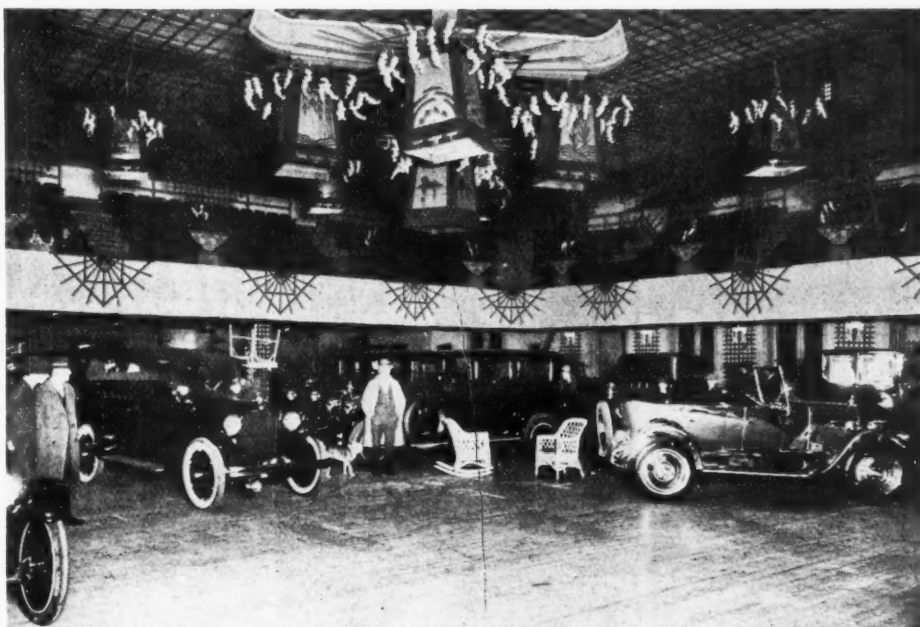
Talks were made by these men and by Secretary of State Sam Koser, T. A. Rafferty, head of the state motorcycle division, and others. About one-half of the time of the meeting was consumed discussing various methods of handling used cars. The Appleby plan, the Boston and New York plans and then the Portland plan were all thoroughly discussed, and suggestions for improvement of the Portland plant talked over.

Just prior to the adjournment of the meeting important action was taken when the association by unanimous vote passed a resolution calling for the passage of measures now before Congress for the repeal of the excise taxes on automobiles, parts and trucks. The secretary was authorized to immediately telegraph the Oregon delegation at Washington a copy of the resolution and urge support of the measure. This was done shortly after the meeting adjourned.

SEE BALLOON TIRES IN DEMAND

AKRON, O., Feb. 23.—That the rubber tire industry will be compelled to use its full strength to produce balloon tires to meet the demand during the coming mo-

Section of Portland, Ore. Show



toring season seems apparent to some of the officials connected with the larger companies.

In some of the factories difficulty is being encountered finding tire builders who can produce the new tires because of the wide difference in building, while others are experiencing difficulty in obtaining equipment sufficiently fast to make needed production possible.

On the other hand, some of the factories which have started making the new tires are reluctant to put in all the new equipment required to make fullest number of tires because of the fact that the tire is in the experimental stage.

PEERLESS NET IS LOWER

CLEVELAND, Feb. 21.—A net profit of \$706,469 after taxes and charges was made through the operations in 1923 of the Peerless Truck & Motor Corp. This compares with \$1,005,113 in 1922. The corporation's balance sheet as of Dec. 31, 1923, shows current assets of \$5,765,916 and current liabilities of \$636,342, including accruals.

It also is reported that funded debt has been wiped out and that there are no bank loans. Through the resetting of the balance sheet early in the year, over \$2,800,000 in good will was wiped out and property account written up to \$5,659,102. Inventory has been reduced from \$5,758,033 to \$3,937,405. Capital stock totals \$6,327,560 and surplus \$4,682,780.

FORM USED CAR BUREAU

CLEVELAND, Ohio, Feb. 21.—The Used Car Bureau of Cleveland Co., has been chartered with an authorized capital of \$10,000 to appraise automobiles, parts and accessories. Incorporators are G. P. Gordon B. Link, E. Kopp, C. L. Sheil and L. Kachel.

Studebaker Corp. Raises On Light and Special Sixes

SOUTH BEND, Ind., Feb. 21.—The promise that President A. R. Erskine of the Studebaker Corp. made to his dealers at the banquet during the Chicago show that the differential between open and closed models would be decreased is partly carried out in the announcement made today of price increases on open models in the Light Six and Special Six lines without disturbing prices on the closed jobs. The list on the open models and chassis has been advanced \$50 on the Light Six and \$75 on the Special. The Big Six line is not affected at all by the announcement.

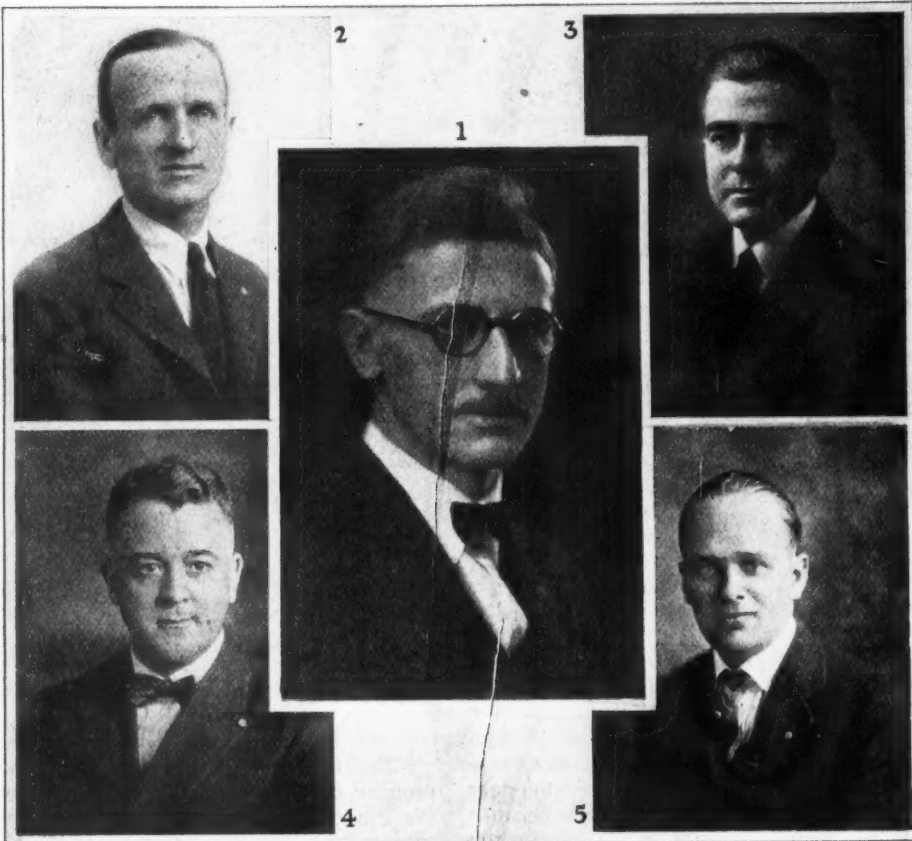
The Studebaker list now is as follows on the Light Six and the Special Six:

LIGHT SIX		
	Old Price.	New Price.
2-pass., open	\$ 975	\$1025
5-pass., open	995	1045
Chassis	845	895
3-pass., coupe	1195	1195
5-pass., sedan	1485	1485
*5-pass., sedan	1395	1395
SPECIAL SIX		
	Old Price.	New Price.
2-pass., open	\$1325	\$1400
5-pass., open	1350	1425
Chassis	1100	1175
5-pass., sedan	1895	1895
*5-pass., sedan	1985	1985
*Special.		

ROLLIN MAKING 35 A DAY

CLEVELAND, O., Feb. 21.—The Rollin Motors Company is now turning out thirty-five cars per day and expects to produce fifty per day by the end of March.

New M. A. T. A. Officers



Michigan Automotive Trade Assn. at its recent meeting elected the following officers: 1—W. P. Staebler, W. P. Staebler & Sons, Ann Arbor, president. 2—Guy A. Butler, Good Will Motor Co., Jackson, vice-president. 3—H. H. Shuart, secretary. 4—L. W. Sanders, Reo Michigan Sales, Inc., Detroit, treasurer. 5—W. D. Edenburn, manager

TO MEET BUS COMPETITION

DETROIT, Feb. 23.—Detroit United Railway lines have requested permission from the Michigan Public Utilities commission to make lower fares effective on some of its lines March 1st. It is understood that the decreases are intended to meet bus competition, the same steps having been taken on other routes several months ago with the sanction of the commission.

AKRON USED CAR SALES MOUNT

AKRON, O., Feb. 23.—The transportation muddle in which a temporary bus and jitney system replaced the city street cars was the occasion of the largest number of used car sales in the city during a similar period during the winter season, according to a large number of dealers who have been interviewed.

It seems certain now that if the street cars do not come back and the bus service does not materially improve, the city will be one of the best markets for used cars in the state during the coming spring season.

Several companies disposed of their entire stock of used cars and made bids to obtain others. The fact that the used car market was good also lead to considerable new buying with trading in of old cars.

SPRINGFIELD, O., SHOW ATTRACTS

SPRINGFIELD, O., Feb. 23.—Attendance at the annual automobile show held here Feb. 15-21 was double that of any former year, and there also was a greater number of models on display than at any previous show. The exhibition was held under the auspices of the Springfield Automobile Dealers Association of which Ben G. Carver is president. One hundred of the new models were housed in Memorial Hall and 20 dealers participated. A feature of the show was the first automobile engine for which a patent was issued by the United States, and first operated on the streets of Springfield 23 years ago. It was designed by Dr. L. E. Russell, who died five years ago.

LOUISVILLE SHOW DRAWS

LOUISVILLE, Ky., Feb. 23.—Approximately 200 cars were sold during the 16th annual show of the Louisville Automobile Dealers Association which closed here tonight and attendance broke all previous records. Thirty-nine exhibitors showed 42 makes of passenger cars. Over 200 dealers were in attendance. The show was held in the Jefferson County Kentucky Armory, which covers 62,000 square feet of floor space, there being no pillars to obstruct the view.

Mitchell Model F-50 Is to Be Continued

New Company Orders Material for Manufacture of 500 Cars

RACINE, Wis., Feb. 21.—Mitchell Motor Car Co. has ordered material for the manufacture of 500 model F-50 Mitchell cars, according to a statement made today by Robert G. Lay, secretary of the corporation. Mr. Lay announced that the company has a plant here, but that it expects to move within 60 to 90 days, location at present unknown. The car to be manufactured is identical with that made by the old Mitchell Motors Co., whose affairs have been wound up under a receivership. Capitalization is reported by Mr. Lay as \$250,000, all paid in.

It was stated also that the Mitchell Motor Car Co. would manufacture parts for Mitchell cars and be in a position to service the vehicles made by the old company. Mr. Lay denied that the Mitchell Motor Car Co. is in any way connected with the Standard Parts Co., of Detroit, or the General Parts Co., Flint, Mich.

L. H. Bridgman, a Flint banker, is president of the company, and Dallas H. Winslow, formerly connected with a leading maker of automobiles is vice-president; Robert G. Lay is secretary. Many of the old employees of the Mitchell Motors Co. are to be retained, it is said.

It is planned to distribute Model F-50 through the old Mitchell dealer organization. The car to be made is the one which was designed by P. J. F. Batenburg, formerly chief engineer of the Mitchell Motors Co. One of the chief features of the F-50 is the slow-speed high torque engine.

GARAGE MEN ORGANIZE

SAN ANTONIO, Texas, Feb. 23.—Fully ninety per cent of the garage men and service station men in Bexar county are members of the newly organized Independent Garage and Service Stations Association of San Antonio, which has just been formed.

I. Schoenberg, of Roth Brothers Auto Supply and Machine Company of San Antonio, was elected first president; A. B. Phelps of the Auto Livery and Garage was named vice-president, and W. B. Stille, Jr., of the Everady Garage, secretary.

ATLANTA FORD SALES BOOM

ATLANTA, Ga., Feb. 23.—The Atlanta branch of the Ford Motor Co. advises that sales this year by the 250 dealers under the jurisdiction of this branch are expected to exceed 80,000, the largest year in the history of the branch. Sales so far this year have been in excess of the quota previously made, and present indications are that they will likely continue on this basis due to the healthy financial condition of the southern agricultural industry, occasioned by high cotton prices.

More Than 200,000 Automobiles Stolen in 28 Key Cities of U. S. in Six Years

Figures Compiled by N. A. D. A. Indicate That Nearly 25 Per Cent
Have Not Been Recovered

ST. LOUIS, Feb. 28.—More than 200,000 automobiles were stolen in 28 key cities of the United States in six years, of which nearly 25 per cent have not been recovered. This is shown in a table of figures on thefts and recoveries made public here today by C. A. Vane, general manager of the National Automobile Dealers' Association. The cars stolen in 1923 totaled 39,612. Of this number 7,228 were unrecovered January 1.

The percentage of unrecovered stolen cars in the 28 index cities, for 1923 was 18 per cent, the lowest recorded since the records have been kept.

Police efforts, certificate of title laws, registration provisions all have had an

effect on the recoveries of cars in 1923, it is believed. In spite of the lowest number of unrecovered cars, 1923 also registered the highest total number of cars stolen in six years in those 28 cities.

Thefts in the index cities totaled 203,499 cars in six years. The recoveries totaled 153,827 cars. The total of cars unrecovered is 49,672. These are figures reported to the N. A. D. A. each year from the official records of the police departments.

Complete tabulation of the thefts, recoveries and unrecovered cars, for each of the 28 cities for each of the last six years with comparative tables on totals, is as follows:

	STOLEN.						RECOVERED.					
	1918	1919	1920	1921	1922	1923	1918	1919	1920	1921	1922	1923
New York	3,340	5,527	5,179	6,808	7,107	7,959	2,578	3,124	2,717	3,451	3,220	4,865
Chicago	2,611	4,447	5,974	6,799	3,636	2,631	1,954	3,447	4,340	4,438	3,919	2,334
Detroit	2,639	3,481	3,300	3,732	3,194	4,428	1,934	2,529	2,563	2,410	2,826	3,654
Cleveland	2,076	2,338	2,649	2,304	1,730	2,307	1,816	1,786	1,765	1,532	1,293	1,867
Los Angeles	1,629	1,688	1,654	2,333	4,802	4,218	1,499	1,365	1,152	1,725	2,772	3,450
*Kansas City	1,144	1,661	801	1,577	1,237	1,555	606	794	341	1,153	1,154	1,315
Portland	1,088	1,528	465	338	472	556	990	1,378	418	303	441	544
*Denver	901	1,440	858	1,862	820	772	627	1,187	651	1,711	742	720
San Francisco	1,122	1,354	1,186	1,652	1,960	2,154	1,082	1,304	1,156	1,608	1,924	2,104
St. Louis	2,241	1,241	788	1,560	1,708	2,535	1,354	944	641	1,247	1,452	2,182
Seattle	1,451	1,422	1,008	861	810	1,342	1,376	1,398	900	710	687	1,213
Indianapolis	404	1,031	1,152	1,238	883	1,066	334	692	833	979	806	981
*Boston	866	1,002	480	490	379	516	607	580	297	216	310	202
Salt Lake City	797	776	592	516	432	430	790	758	555	482	404	418
Oakland, Cal.	895	760	564	729	713	1,015	860	733	549	680	639	969
*Omaha	1,039	734	634	927	856	558	669	567	507	855	819	568
Columbus, Ohio	451	550	513	408	349	511	352	373	278	355	328	486
*Cincinnati	348	520	525	741	691	963	291	293	273	445	484	855
Oklahoma City	571	149	205	493	518	356	484	70	133	396	369	281
Albany	41	133	87	234	322	329	29	104	70	177	237	216
Buffalo	1,262	986	743	1,152	1,609	2,102	914	700	507	928	1,418	1,880
Newport, R. I.	4	9	12	14	28	24	4	9	12	14	28	24
York, Pa.	6	10	8	2	25	30	6	9	8	2	18	27
Grand Rapids	152	189	262	267	345	391	149	137	250	207	319	362
Richmond, Va.	84	207	148	130	287	308	62	161	93	100	242	286
*Dayton, O.	207	228	198	227	249	313	241	213	217	243	233	348
Lowell, Mass.	26	25	18	36	64	47	16	17	7	31	54	42
Evansville, Ind.	50	72	43	124	108	196	49	68	40	119	102	191

	STOLEN.	RECOVERED.	NOT RECOVERED.
1918.....	27,445	21,673	5,772; 21 per cent of number stolen
1919.....	33,508	24,740	8,768; 26 per cent of number stolen
1920.....	30,046	21,273	8,773; 29 per cent of number stolen
1921.....	37,554	26,517	11,037; 29 per cent of number stolen
1922.....	35,334	27,240	8,094; 23 per cent of number stolen
1923.....	39,612	32,384	7,228; 18 per cent of number stolen

ADDITIONAL RECOVERIES FOR 1923.

*Kansas City.—120 cars stolen in other cities.
 Denver.—6 cars stolen in 1921; 8 cars stolen in 1922; 28 cars stolen in other cities.
 Boston.—21 cars stolen in other years; 37 stolen in other cities.
 Omaha.—115 cars stolen in other cities.
 Cincinnati.—85 cars stolen in other cities.
 Dayton.—Reports 340 recovered out of 313 stolen and states 19 "unrecovered." Some recoveries undoubtedly were cars stolen in other cities.

NEW HAYNES DISTRIBUTOR

CHICAGO, Feb. 21.—Appointment of the Roy Iverson Company as distributor of the Haynes car for the Chicago district is announced by the factory. The new appointee succeeds the Triangle Motors Co., and in addition to Haynes will continue to act as distributor for Anderson. The territory embraces Illinois as far south as Danville and the northern part of Indiana.

TEST RIGHT TO USE CAR

WASHINGTON, Feb. 21.—The question as to whether or not a garage owner has committed a breach of the law in using or permitting an employee to use an automobile left with him for dead storage, has been sent to the District Courts as a result of the local police court holding that an automobile proprietor cannot lawfully use a motor vehicle stored in his garage.

Standard Oil Co. to Distribute Ethyl Gas

Will Handle Sale of General Motors
Product in Eastern Part
of U. S.

NEW YORK, Feb. 23.—Under a contract which is being negotiated between the Standard Oil Co., of New Jersey and the General Motors Corp., the former will act as distributor in the eastern part of the United States for ethyl gas, the anti-knock mixture developed by the General Motors Research Corp. at Dayton. As soon as the necessary arrangements can be made the Standard Oil Co. of New Jersey will carry ethylized gasoline at its own filling stations and also will supply it to other petroleum marketing companies which at the option of the purchasers will add ethyl in the correct proportion to gasoline supplied.

Ethylized gasoline now is being marketed in Chicago, Cincinnati, Pittsburgh and other places in the middle west. Gasoline with the ethyl fluid added sells for three cents a gallon above current gasoline prices.

It is understood that General Motors will install ethylizers on the gasoline pumps of the oil companies so that motorists can buy their gasoline either plain or ethylized. This ethylizer will be a glass container with measuring equipment attached to deliver the proper quantity of ethyl required for the amount of gasoline purchased. This will be a preliminary step, for if the mixture proves as popular as expected the ethyl will be mixed with the gasoline at the refineries.

JEWETT SEES SHORTAGE

DETROIT, Feb. 23.—In a statement by H. M. Jewett, president of Paige-Detroit Motor Car Co., it is set forth that the increased price trend in the six-cylinder medium-priced field is brought about by the practical certainty of a shortage of cars and that no promise can be made that present low prices now obtaining on the Paige and Jewett models, particularly the latter, can be continued.

Manufacturers as a whole are not discussing the possibilities of price increases taking place, but there is a unanimity of opinion that open models in practically every line have been priced too low.

SCRANTON HEADS MACCAR TRUCK

SCRANTON, Pa., Feb. 23.—Philo Butler and L. H. Conklin have been added to the board of directors of the Maccar Truck Co., with the election of Worthington Scranton as president and R. H. C. Rupp and B. A. Guy as vice-presidents. An executive committee composed of several members of the board will direct the affairs of the company with the counsel of an advisory committee composed of prominent bankers and manufacturers.

Engineers Agree on Primary Signals for Traffic Control

Red, Green and Yellow, With Not More Than Three Shades, Recommended by Engineers

NEW YORK, Feb. 21.—Red, green and yellow for primary traffic control signals and not more than three shades of any one of them, are recommended by the American Engineering Standards Committee which has been studying traffic conditions with a view to making for greater safety for both drivers and pedestrians.

Charles J. Bennett, former State Highway Commissioner of Connecticut, is chairman of the committee which has had this work in hand and numbered among his colleagues are Pyke Johnson of the National Automobile Chamber of Commerce; M. L. Heminway, Motor and Accessory Manufacturers Association; Harry Meixell, Motor Vehicle Conference Committee; David Beecroft, American Automobile Association; W. A. McKay, Society of Automotive Engineers; and others whose associations are interested in bringing about needed reforms in safety signals and the like.

This committee has been working diligently for some time and soon will present an exhaustive report on its progress. At the present time it feels as if it has made considerable headway, as shown by a preliminary report just made which says in part:

Three working committees have collected and digested the information pertaining to visibility of different colors and have reached the conclusion that the experience of the railroads dare not be disregarded by using more than the three colors of red, green and yellow, in primary traffic control signals. They will shortly formulate recommendations as to just what meaning should be assigned to each of these three colors and just what range in color vision shall be allowed to that color. In other words, how orange a red may be and still be called red, not yellow.

They have agreed that all highway signals intended for automobilists to read ought to employ the same color scheme. Whatever color is selected for the letters ought to be the same everywhere in the country. Also, whatever color is selected for background should equally be the same everywhere in the country.

At the present time black, white, red, yellow, blue, green, brown, etc., are in use indiscriminately for both letters and background, so that a motorist cannot tell whether or not he should observe a sign on the roadside until he has read it.

It is recommended, too, that highway traffic signs intended for pedestrians shall employ a different color scheme from those used for motorists' directions. The committee will doubtless proceed, in the near future, to the next step of selecting the particular colors to be recom-

mended to road and street supervisors as reserved for traffic signs.

All these suggested colors and rules will soon be drafted into the form of a code of procedure to recommend to police and highway officials for adoption.

Michelin Announces First Clincher Balloon Tire

MILLTOWN, N. J., Feb. 23.—What is believed to be the first clincher balloon tire to be marketed in this country has been announced by the Michelin Tire Co. This tire is designed to replace 30 x 3½ in. tires and is termed 31 x 4.40, which is one of the sizes approved by the Rubber Association although no mention of a clincher tire is included in the Association's recently published list of sizes.

The new tire is a true balloon tire in that it has a thin wall and is designed for low inflation pressures. In the case of the Ford car with average load, the recommended inflation pressure is 20 lbs. on front wheels and 25 lbs. on rear wheels.

Deliveries of this tire are now being made from all branches of the Michelin company. The price is said to be slightly less than that of the Michelin oversize cord for the same 30 x 3½ in. rim. Tread design is similar to that formerly used on Michelin oversize cords.

In general design the new tire is based on Michelin experience in France where balloon clinchers in a variety of sizes have been in successful use for several months. It is claimed that these tires not only give a greater mileage than ordinary cords which they replace, but that they increase materially the life of the car on which they are used.

TRAFFIC PUZZLE BOOSTS CAB USE

CHICAGO, Feb. 21.—Traffic congestion has resulted in the increased use of taxicabs, it is declared in a report just issued by the Yellow Cab Co. Many people, it is said, evidently prefer to avoid the inconvenience of traffic jams by riding in cabs rather than driving their own cars. Last year the company carried 23,000,000 passengers over a distance of 90,000,000 miles. This increase in business necessitated the addition of 1,000 cabs to the equipment. The increase over 1922 is placed at 4,000,000 passengers. It is said that on New Year's Eve, despite the blizzard, receipts approximated \$100,000. The company now operates 2,600 cabs in Chicago.

LABOR TURNOVER SMALL

LANSING, Mich., Feb. 23.—The Reo Motor Car Co. reports a labor turnover during the past year of less than 3.7 per cent a month. This is not the lowest record that the company has made in this particular, but officials consider it especially good in a year in which work was plentiful and in which there was a tendency among workmen to change employment frequently. January turnover is reported by the company as being only 1.6 per cent.

Plan Strengthening of N. Y. Automotive Trade Assn.

Proposal Involves Increase of Membership Fee and Employment of Paid Manager

ALBANY, N. Y., Feb. 21.—Delegates from the city associations which make up the Empire State Automobile Merchants Association have been in session here this week considering plans for perpetuating and strengthening the organization which is about a year old and which now has nearly 300 dealer members, representing twelve cities. It is proposed to increase the per-dealer annual membership fee from \$10 to \$30 so as to put the association's finances on a basis which will permit employment of a full time manager.

In connection with the meeting the recently elected president of the association, E. J. Ellis, Dodge Brothers dealer in Rochester, has issued a statement to the dealers of the state announcing the past accomplishments and future ambitions of the association.

Mr. Ellis in his statement emphasizes the fact that the organization is one "of dealers formed by dealers to work for dealers, so that the conditions under which we do business may be less burdensome, and furthermore, so that the operation of cars by owners be as economical as possible and free from unwise and unnecessary regulation." The organization has been operated for the year with E. F. Moree, general manager of the Automobile Merchants Association of New York City, as part time manager.

The work of the year has been largely devoted to recruiting members, yet despite that fact, a number of accomplishments are recorded in President Ellis' statement, as follows:

Persuasion of the State Tax Commission to designate automobiles as passenger cars rather than pleasure cars on the license application blank.

Persuasion of the commission to change the wording of the blank so that the car owner testifies to the "year of manufacture" rather than the "manufacturer's year." Under this arrangement it is possible for a 1924 car, for instance, to be designated a 1924 car no matter in what year the car happened to be originally sold.

Appointment of a motor vehicle committee of the State House Assembly with Lewis G. Stappely, an automobile dealer, as chairman.

Co-operation with the motor clubs of the state to improve legislative and administrative acts pertaining to motor vehicle operation.

Mr. Ellis proposes that permanent headquarters be established at Albany, capital of the state, with a full time manager in charge, and that the organization prepare itself to work actively and continuously for better legislation affecting motor vehicle operation and for improvement of trade conditions.

Kansas City Buyers Throng Big Show of Motor Vehicles

Good Values Bring Sales and Swell Prospect Lists; Attendance About 40,000

KANSAS CITY, Mo., Feb. 23.—Buyers were much in evidence in the huge crowd that thronged the American Royal Building here which housed the eighteenth annual automobile show Feb. 9-16. According to President A. P. Ten Brook, of the Kansas City Motor Dealers' Association, approximately forty thousand people passed through the doors, of which number 22,000 paid admission.

The decided improvements in engines, general constructive refinements, elimination of excess body weight and use of devices making for durability, convinced the public of the value of the products offered. Better cars at lower prices, together with the favorable trend of increasing business and general prosperity were some of the underlying factors which caused in many cases, purchases of cars.

Comfort of Visitors Provided For

The show building has a large arena room; the arena floor being devoted to passenger cars. Part of the balcony was screened off with painted scenery, but four tiers of balcony seats, and all the box seats, remained available for use. Visitors took advantage of the seating facilities to rest. Scores sat in boxes near exhibits where lectures were being given by factory representatives, listening in comfort.

An annex, under the same roof and entered from the arena floor through wide doors, held additional passenger car displays, trucks and buses.

Forty-four motor dealers exhibited, in 126 booths, showing 400 vehicles.

Four-wheel brakes were a drawing card, and the subject of lectures. Crankshafts also came in for much attention and lecturing.

The influence of the woman-driver and woman-buyer was evidenced in the predominance of neutral shades in the body job shown. Gray was the prevailing color, in Buckingham, battle-ship, silver fox, sage brush, dust, etc.

The Chrysler Six and the Rollin were new cars shown.

A novelty in the motor show was a motor boat, the Dodge Watercar, built by Horace E. Dodge, Jr.

Ample building space gave truck companies unusual opportunities for display, and for demonstrating material. Buses were a conspicuous feature at the show, and a subject of interest, especially to the hundreds of officials and boosters of highway associations attending various meetings held during the show.

N. A. D. A. URGES TAX REMOVAL

ST. LOUIS, Mo., Feb. 23.—Headquarters of N. A. D. A. here last week sent out the second broadcast in the campaign

to remove the war tax from the sales prices of automobiles in the form of 40,000 pieces of literature to members and dealers asking that members of the Finance Committee of the United States Senate be enlisted in the movement for the repeal of the tax. The first move was made the week previous in the form of a command to the dealers to write or wire members of the Ways and Means Committee of the Senate but it has since developed that the matter is not in the hands of that committee but is pending before the Finance Committee.

Officials of the N. A. D. A. say that the response to the first letter has been very gratifying, dealers from all over the country have taken the matter in hand, have written to congressmen and senators and have asked their customers to do likewise. Several senators and representatives have promised their vote for the repeal of the tax.

N. Y. BOOSTERS' CLUB PLANNED

NEW YORK, Feb. 23.—Steps are under way to form a chapter of the Boosters' Club in the metropolitan territory. J. H. Cooper of the E. A. Laboratories, Inc., is an active spirit in the movement, which will bring together sales representatives of automotive equipment manufacturers, working in New York and vicinity. The club will be started with New York members of the original New England club as charter members and will be affiliated with the Automotive Boosters, International.

N. A. D. A. SECRETARIES TO MEET

ST. LOUIS, Mo., Feb. 23.—Another conference of automobile dealers' association secretaries will be held this year under the auspices of N. A. D. A. Officials of N. A. D. A. announced last week that the meeting would be held the first week in June of this year, the exact time and place to be announced later.

The first of such conferences held in Chicago last year was attended by about 40 secretaries and was productive of much good. It is expected that this year's conference will be more largely attended.

Tax Repeal Fight in Congress Carried to Floor of House

Bills Seeking Relief for Vehicles, Parts and Accessories Introduced in Senate

WASHINGTON, Feb. 21.—The fight for the repeal of the automobile excise taxes was carried this week onto the floor of the House when proponents of the measures spoke in favor of the repeals.

In the Senate bills for relief of some of the automobile taxes were introduced by Senators Copeland (N. Y.) and Edge of New Jersey.

The outlook for favorable action on the parts and accessories taxes and possibly a part of the truck taxes was characterized as "good" by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, who has spent the past ten days in Washington working in the interest of the measures. Congressman Clancy declares that he is optimistic for the passage of the accessories, parts and truck tax repeals.

C. A. Vane, of St. Louis, representing the National Automobile Dealers Association, has been in Washington for the past week conferring with members of Congress. He pointed out that a very bad situation exists among a great many of the dealers who, because of keen competition, are taking in second-hand automobiles and allowing on the second-hand deal the amount of the excise tax. One of the chief factors from the dealer's standpoint, he states, is that a purchaser of an automobile after paying the factory cost, freight, insurance, carrying charge, and the excise tax, figures that he has paid so much for his automobile. Were the purchaser to sell his automobile a month later he would find that he could not, as might be reasonably expected, secure anything like the original price paid, for the reason that the automobile, classified when he sells it, as a second-hand car, must be sold with the depreciation, taxes, freight, etc., written off, he declared.

View of Kansas City Show



BUSINESS NOTES

The Davis Tire and Rubber Co. has been organized in Ogden, Utah, to make automobile tires. The company has a capital stock of \$500,000. Edward N. Davis is president; and L. L. Peck, sec.-treas.

Announcement is made by The Advance-Rumely Thresher Co., Inc., La Porte, Ind., that its new catalogue is ready for distribution to dealers. It covers the entire Advance-Rumely line, and is divided into sections which give complete information regarding each type of implement made by the company.

Motor Wheel Corp. has organized one department of its Harvey, Ill., unit for the production of disk wheels for balloon tires, to meet demand for replacement wheels from owners.

The Mechanical Tool & Specialty Co., 130 Oneida street Milwaukee, manufacturer of and dealer in tools, mechanical devices, etc., has incorporated its business with a capital stock of \$30,000, under the new name of Mechanical Tool & Supply Co. The ownership remains vested in A. W. Park and G. H. Stine.

A loss of \$6,000 was caused by fire in the plant of the Standard Piston Pin Co., at Racine, Wis., on Feb. 11. The greatest damage was caused by water. Repairs and replacements have now been completed and deliveries are going forward without interruption.

The Bower City Stamping Co. has been organized at Janesville, Wis., and incorporated with an initial capital of \$10,000 to engage in the general manufacture of metal stampings, particularly for the automotive industries. A plant has been equipped and production is now in full swing. Principals in the enterprise are: A. Bergholz, R. L. Cummings and R. J. Conway, all of Janesville.

Creditors of the Ruggles Motor Truck Co., Limited, London, Ont., meeting recently decided to entrust the operation of the company to the London and Western Trust Co., with the cooperation of five inspectors also appointed at the meeting. According to a report presented by the trustees, assets of the Ruggles organization totalled \$603,644 and liabilities, so far ascertained \$1,345,960.

Four Wheel Drive Auto Co. reports 1923 total sales 38 per cent better than in 1922. Its surplus at the end of the year was \$893,795, while its cash on hand, with investments, outside of accounts receivable, amounted to nearly \$900,000.

Reynolds Spring Co. reports gross business in January of \$290,000, against \$250,000 in January, 1923.

General Motors Corp. has declared regular quarterly dividend of thirty cents on common, payable March 12 to stock of record Feb. 25. Regular quarterly dividends of \$1.50 on the six per cent preferred and six per cent debenture and \$1.75 on seven per cent debenture stock were declared, May 1, to stock of record April 7.

Edmunds & Jones Corp. in its consolidated income account for 1923 shows net income after charges and taxes of \$450,116, equivalent after deduction of preferred dividends, to \$10.36 a

share on the 40,000 shares of common stock of no par value. This compares with net income of \$390,529 in 1922. The balance sheet shows assets valued at \$2,534,800, including \$130,916 cash, \$446,787 accounts and notes receivable and \$819,096 in inventories.

The Michigan Stamping Co. which was taken over last year by the Briggs Manufacturing Co. has called for redemption March 1, all of its preferred stock at par of \$100 a share plus a premium of \$5 per share. The regular quarterly dividend on preferred has been declared payable March 1, to holders of record of Feb. 15. From and after March 1, dividend on preferred will cease and certificates thereafter will carry only surrender rights. The Union Trust Co., Detroit, has been appointed agent.

The Victory Mfg. Co. has been incorporated at Fond du Lac, Wis., with an initial capital of \$6,000 to engage in the manufacture and distribution of Arle's Victory Polish and a general line of waxes, polishes, cleaning compounds and similar materials. The factory and offices are at 701 Wisconsin avenue. Robert A. Beck is president and general manager.

The Marathon Battery Co., organized recently at Wausau, Wis., with \$150,000 capital stock, has taken over a large manufacturing building in that city and is retooling it throughout for the manufacture of a general line of storage batteries and dry cells for automotive, radio and similar use.

The A. O. Smith Corp., Milwaukee, which has been executing an important plant extension program for the past year, has just placed contracts for the steel work for a number of minor additions which will make use of bays between some main buildings as well as extend others to promote efficiency of production as well as larger output of pressed steel frames, forgings, stampings and automotive equipment specialties.

The Petralyke Co., established at Appleton, Wis., a little more than a year ago to manufacture windshield visors and other specialties, has decided to relocate in South Milwaukee, Wis. The Petralyke plant in Appleton was badly damaged by fire in January.

The Dehco-Cleveland Enameling Co., has been incorporated with a capital of \$10,000 to enamel and polish autos, trucks and so forth. Incorporators are: Bertrand E. Layman, Jesse Atkinson Bleakney, Herbert D. Palmer, Ira J. Werner and Max D. Gustin.

The Auto Utilities, Incorporated, has been chartered with an authorized capital of 200 shares, no par value designated to manufacture, buy, sell and deal in automobile accessories. Incorporators are: John A. Novario, Richard J. Fitzgerald, Frank Costentino, Joseph DeOreo and John A. Ringold.

The H. S. Thomas Motor Co., has been chartered with a capital of 250 shares, no par value designated to manufacture, buy and sell automobiles and parts. Incorporators are: Henry S. Thomas, William E. Casperson, Fred F. Field, F. M. Collins and Alice L. Nolan.

salesmen was present at the luncheon of the Chicago Automobile Trade Association last Wednesday to hear a discussion on the cost of doing business by C. E. Fraser of the Bureau of Business Research of Harvard University. Although Mr. Fraser did not have figures applicable to the automotive business, he discussed general principles which the Harvard Bureau has found are common to all business. The meeting was one of a series of luncheon meetings scheduled this winter at which dealers and their employees are guests of the association.

Dayton Keith, vice president of the association, presided.

GAS TAX LAW VALID

WASHINGTON, Feb. 21.—The Supreme Court has handed down a decision upholding the Arkansas law taxing sales of gasoline. This is the first time that the gasoline law, adopted by many states, has been passed upon by the Supreme Court.

Tire Sales Are Better, Rubber Assn. Report Shows

Figures Turned in by 90 Per Cent of Manufacturers Indicate Progress Made in 1923

NEW YORK, Feb. 23.—Reports furnished by more than 230 manufacturers representing more than 90 per cent of the industry, compiled by the Rubber Association of America, show the sales value of tires and tire sundries in 1923 was \$557,464,000, against \$532,193,000 in 1922. Consumption of crude rubber also was greater, 217,952 tons being used in 1923, against 207,203 in 1922.

The first half of 1923 was better than the last six months, with the value of the product being placed at \$299,726,000 as compared with \$258,738,000 in the second half. In the first half the rubber consumption was 134,556 tons, against 83,396.

Price reductions last fall show in the report of the final quarter in which the sales value of pneumatic casings was \$100,251,000, against \$100,707,000 in the preceding quarter, requiring 31,947 tons of crude as compared with 27,947 in the third quarter.

Inner tubes in the final quarter required 9,648 tons of rubber in comparison with 8,065 in the third quarter, the sales value being \$17,175,000, against \$19,263,000. Motorcycle tires, including both casings and tubes, were valued at \$346,000; bicycle tires, \$1,055,000; all other pneumatic casings and tubes, \$45,000; solid tires for motor vehicles, \$6,345,000; all other solids, \$147,000; tire sundries and repair material, \$2,811,000.

The grand total sales value of all rubber products, tires, mechanical rubber goods, etc., was \$883,420,000 for 1923, against \$795,085,000 in 1922. Last year 274,956 tons of crude rubber were consumed, against 254,183 in 1922.

The report shows at the end of the fourth quarter in 1923, there were 72,920 long tons on hand and 36,465 afloat.

OAKLAND PRODUCTION RECORD

DETROIT, Feb. 21.—Production by Oakland Motor Car Co. for January was larger than in any previous months with the exception of January, 1919, according to factory report. In the last week of the month production reached a daily mark of between 275 to 300. Dealers are reported by the company making plans for a heavy spring sale. Oakland sales in California in December brought the company to ninth place, coming forward from 19th place in December, 1922.

INSTRUCTORS MEET

MILWAUKEE, Wis., Feb. 21.—Instructors in automotive mechanics in all vocational training schools in Wisconsin met at the Vocational school at Racine, Wis., on Feb. 14 and 15 in the first statewide conference to discuss equipment and courses of study offered in these institutions.

Bassick-Alemite Earns Net Profits of \$1,422,583

CHICAGO, Feb. 22.—Prosperity in the automotive industry during 1923 is reflected in the annual report of the Bassick-Alemite Corporation, made public here today, which shows net income, after changes and taxes, of \$1,422,583, equivalent after preferred dividends to \$7.11 per share on the 200,000 shares of nonpar common stock. After payment of dividends and a charge of \$102,421 for amortization, a balance of \$925,514 was added to surplus, increasing the net worth of the common stock to \$5,594,161, or \$27.97 per share.

Prospects for 1924, according to officials of the company, are exceedingly bright, and greater stability in prices is reported.

DEALERS HEAR C. E. FRASER

CHICAGO, Feb. 21.—A large attendance of automobile dealers and their

CONCERNING MEN YOU KNOW

"Samuel F. Jacobson, who for the past eight years, has been associated along Michigan avenue Auto Row, in the capacity of jobber and distributor of automobile accessories and equipment, has returned to the practice of law. He is associated with the law firm of Decker & Golden, 111 W. Monroe street, Chicago.

Harry Meixell, secretary of the Motor Vehicle Conference Committee, in which are affiliated the N. A. C. C., the M. A. & M. A., the A. A. A., S. A. E. and several other bodies, and also secretary of the Legislative Committee of the National Automobile Chamber of Commerce, has resigned to become general manager of the Mortgage & Title Guaranty Co. of New Jersey, with headquarters in Newark. Mr. Meixell is succeeded as secretary of the Motor Vehicle Conference Committee by Russell Huffman, a Columbia graduate, who has been associated with him in his automobile legislative work for some time.

W. N. Hallinger has been appointed manager of Motor Truck Industries, Inc., to succeed Don F. Whittaker who resigned recently to become a zone sales manager in the Haynes organization.

E. J. Cosgrave has been appointed New York manager of The Eaton Axle & Spring Company, in charge of the Perfection Spring Service Station, 616 West 56th street, and the Eaton Bumper Show Room at 1846 Broadway.

Jo Berge has resigned from the force of the AC Spark Plug Co., of Flint, Mich.

Edward Harr Crowley, Los Angeles, Calif. has been appointed sales manager of the Climax Engineering Company. He has been a field man many years.

F. A. Harmon has been appointed manager of the F. G. Parker Co., Studebaker distributor and dealer in Springfield, Mass. Mr. Harmon was formerly with the H. W. Tyas Co., Studebaker dealer in Providence, R. I. John H. Manning has been promoted to the position of service for the Springfield company.

C. A. Porter, Peoria, Ill., has announced his intention of returning to the business, with a garage at 1909 Main street. He will conduct a general repair and accessory business.

E. A. Taylor of Detroit has been named works manager for the Yellow Sleeve-Valve Engine Works of East Moline to succeed A. A. Gustafson. Mr. Taylor has been associated with the Maxwell, Pierce Arrow and Liberty motor corporations.

Charles W. DuPre, for some years a Reo distributor in Atlanta, and one of the best known automotive dealers in the Southeast, was burned to death recently when fire destroyed his home near Atlanta in the early morning. DuPre had succeeded in saving the life of his mother-in-law, and then went back into the burning room to bring out his wife when the floor collapsed, resulting in the death of both himself and Mrs. DuPre.

R. F. Frizelle, who for three years has been connected with the Boston branch of the Wood Hydraulic Hoist & Body Co., has been transferred to the home office and appointed manager of the sales promotion department.

Lee H. Hazard has retired as production manager of the Velie Motors Corporation after fifteen

years service, commencing as draftsman. His future plans are not announced. He was succeeded by A. W. Weigel who has been assistant.

Judson S. Joslyn, Rockford, Ill., has retired from the automotive business after twenty years and plans to travel extensively. He signed his first motor car contract with the Jeffrey Automobile Company in 1903 and has been distributor for the Nash car since their manufacture was first commenced.

A. A. Crumley, manager at Evanston, Ill., for the Packard Motor Car Co. of Chicago, has been promoted to the managership of the Milwaukee branch at 3501-3511 Grand avenue, taking the place of Benjamin C. Mott.

Joseph Berge, speedometer engineer of the AC Spark Plug Co., has announced that he will retire from that position March first and will engage in private practice with offices in Flint. He was formerly with Stewart-Warner company.

Changes in personnel followed the annual meeting of the Autocar Co., of Ardmore, Pa., when the old board of directors was reelected. Walter T. Savoye was elected a vice-president, being succeeded as treasurer by John C. Taney. Roscoe T. Anthony was elected Mr. Taney's successor as secretary and assistant treasurer. Miss Mary H. McGonigle was added to the executive staff as assistant secretary and assistant treasurer.

Fred J. Berkley has been elected vice-president of the Berry Motor Car Co., St. Louis Packard distributor. He succeeds Edward S. Maddock who resigned in order to make his home in the east.

Paul W. Pelsue who has been connected with the Berry Company for two years in charge of the stockroom has been appointed service manager. Berkley has been connected with Packard distribution in St. Louis for eight years and has for some months been a director of the Berry Co.

K. R. Friedlander has been appointed manager of the Des Moines, Ia. branch of the Mason Tire and Rubber Co., succeeding C. J. Marx, resigned.

Northern Rubber Co., Akron, O., announces reelection of L. J. Schott, organizer of the company, as president; P. H. Snyder of Massillon vice-president and treasurer and Owen Moynihan.

Announcement has been made by the Mohawk Rubber Co. that S. S. Miller, formerly factory manager of the company has succeeded R. M. Pilmore as president. Mr. Pilmore's reasons for retiring were not given. Mr. Miller was formerly superintendent of the Goodyear Tire and Rubber Co. and the Kelly-Springfield Tire Co., and has been factory manager of the Mohawk Co. since 1912.

C. G. Van Vliet has been appointed secretary of the local motor trades bureau of the Chamber of Commerce, succeeding S. P. Whiting. For several years he was secretary of the Des Moines Automobile Dealers' Association.

Effective March 1, R. M. Kincaid who has been works manager since August, 1920 for the U. S. Light & Heat Corp., Niagara Falls, N. Y., has resigned to accept a position with the Garford Motor Truck Co. of Lima, O.

property was purchased for \$92,000, according to attorneys connected with the sale.

REDUCE BRAKE DATA COST

NEW YORK, Feb. 21.—The Asbestos Brake Lining Association has decided to cooperate in the publication of the Standard Data Book, which contains current statistics relating to the sizes of brake linings and clutch facings. This will effect a saving of approximately \$15,000 a year in the reduced cost of the books. One central clearing house will obtain, revise and compile all of the data and one firm will publish the book.

OLDS DEALERS SEE BIG BUSINESS

ST. LOUIS, Feb., 23.—Oldsmobile dealers here, Feb. 18, held what they declare to be the most successful meeting in their history and are enthusiastic over the future of the car and the prospects for 1924.

U. S. Survey Shows a General Improvement in Employment

Automotive Factories Running Full Time Are Responsible for a Large Part of Gain

WASHINGTON, Feb. 23.—A general improvement in the employment situation throughout the country is indicated in the Monthly Industrial Survey of the U. S. Employment Service, Department of Labor. On Jan. 31, the figures show a total of 2,600,100 employees on the payroll of 1,428 representative manufacturers, as against 1,986,132 on December 31, and 1,928,447 on Jan. 31, 1923. Those increases are primarily in the automobiles, iron and steel, leather, paper and chemical groups.

In Detroit the survey shows an ample supply of automotive workers; in Grand Rapids the automobile accessory plants are operating overtime; in Flint there is a demand for skilled automobile mechanics with a small surplus of transient labor. One automobile plant at Flint announces a building program costing approximately \$10,000,000. All automobile manufacturers are operating on full-time basis. In Kalamazoo one motor car company and a cab company are closed. Motor car manufacturers in Bay City, Mich., are working day and night shifts.

In Ohio some of the rubber factories report that they have put on many additional workers. Cleveland automobile accessory manufacturers are operating on a reduced time and force schedule. In Toledo a surplus of workers in automobile accessory plants is reported. One motor car company and one automobile accessory plant are operating on part time. In Akron rubber factories are all operating with full forces on spring and summer business. Practically all of the companies are taking on men and running three shifts; however, the surplus of workers has not as yet been absorbed. Nearly all plants are operating overtime and expect to continue on this basis during February and March.

RECORD SHOW AT WHEELING

WHEELING, W. Va., Feb. 23.—Attendance and sales made at the annual automobile show held here for three days beginning Feb. 14 broke all records in the history of the city. The show was held in the two-story garage of the McGraw Motor Co., Ford dealers. About 75 cars were exhibited, representing 30 manufacturers. Closed cars on exhibition outnumbered the open models 8 to 1, and one dealer reported that his sales for the past year were 60 per cent on closed and 40 per cent on open cars. The interest in balloon tires likewise was marked.

BUSSES SUPPLANT STREET CARS

EMPORIA, Kans., Feb. 21.—Motor busses will be substituted for street cars as a result of the special election held here. The majority was 353.

ENLARGE FORD OMAHA PLANT

OMAHA, Feb. 21.—The Ford assembly plant here will soon be enlarged and altered at a cost of \$75,000, so as to more than double the daily output of cars. The new equipment will make possible the assembly of closed cars, never before assembled here. New ovens for the forced drying of paint and for drying wheels will be installed, as well as equipment for trimming enclosed bodies.

A new one-story building, 76x150 feet will be erected and equipped within ninety days. The present output of the plant is 160 cars. The new plant will turn out 310 cars and trucks daily.

EXCEL RUBBER SALE APPROVED

MARION, O., Feb. 23.—Sale of the former Excel Rubber Co. plant at Wadsworth to the Studebaker-Gulf Co. here, has been judicially confirmed. The new company expects to start production of tires in the very near future. The Excel

IN THE RETAIL FIELD

A new building at 2216-18 So. Jefferson avenue, St. Louis, has been completed for the Big Four Auto Co., Chevrolet dealer. It is a one story fireproof structure 60 by 110 feet. The company's former location at 2224 Jefferson avenue, has been made over into a parts department and service department.

The T. W. Meiklejohn Co., Fond du Lac, Wis., Fordson distributors in the Wisconsin and Northern Michigan territory, has opened a new headquarters in Milwaukee, at Prospect avenue and Kenilworth place. The present establishment in Fond du Lac will be retained.

The Edwards Motor Car Co., Milwaukee, distributor of the Dodge and the Graham truck, will start work at once on a 1-story extension.

A fireproof garage 50 by 60 feet of fireproof construction has been built by the Chamber & Long, Inc. Co., at 1123 Pine street, St. Louis, downtown Ford distributors. It provides 30,000 sq. ft. of floor space and is entirely free from obstructions and is steam heated. Chambers & Long have taken a five year lease on it.

The Bridgeport Motor Co. at Bridgeport, Nebr., are now settled in their new building 75 by 100 feet. They are the authorized Ford dealers.

The Burke Motor Co., Springfield, O., distributor, has moved from auto row in North Fountain avenue to 112 East Columbia street.

George W. Higgins, local Dodge distributor, has moved into the former Burke Co. quarters in North Fountain avenue.

Portsmouth, O., Auto Supply Co., has filed papers with the secretary of state, authorizing the increase in capital of the company from \$30,000 to \$100,000 divided into 700 shares of \$100 each.

The Johns G. M. C Truck Sales Co., has been chartered with an authorized capital of \$10,000 to buy, sell and deal in motor trucks and motor cars. Incorporators are: N. M. Greenberger, J. D. Hotchkiss, E. M. Wackner, M. K. Weibel and H. A. Sullivan.

The Mefford Tire & Supply Co., has been incorporated with a capital of \$15,000 to conduct a garage and buy and sell tires, tubes and motor and tire accessories. Incorporators are: L. W. Baker, E. W. Finkle, R. E. Sheldon, C. E. Cannon and C. R. Bollinger.

Through error an item in the February 7th issue of MOTOR AGE gave the name of the retiring partner of the Presto Distributing Co., Hartford, Conn., as George A. Fisher. This should have been George S. Fresher.

Brude Visor Co. have opened a store at 2009 Michigan avenue, to take care of the distribution of their products in Chicago.

Sherman & Natwick, Studebaker dealers at Wisconsin Rapids, Wis., have leased a larger building on Grand avenue and after remodeling it will occupy the structure as sales and service headquarters.

The Woodside-Poppe Motor Co., Milwaukee, Wis. has changed its corporate style to Collins-Poppe Motor Co.

The Lakeside Repair Shop, 85-87 Farwell avenue, Milwaukee, is now under the sole ownership and management of Stanley Pollin, who has acquired the interests of Chris Thomsen.

Spalding Motor Co., Inc., distributors of Durant and Star cars in this district, have moved to the Firestone Building, 3205-07 Locust boulevard. For the present it will occupy one-half of the structure until the Firestone company can secure other quarters, and then the entire building.

A new automobile concern, the General Chevrolet Sales Corporation has leased the entire first floor of the new Reakirt Building, East Sixth street, Cincinnati. W. J. Fuller is president, R. K. Le Blond, vice-president and E. A. Roden, secretary.

Rolls-Royce Co. of America, announces that Wilson H. Porter has been appointed branch manager in San Francisco, succeeding N. B. Jackson. Mr. Porter was with Locomobile many years. John W. Thomas is to be resident representative in Rochester, N. Y.

Auburn Automobile Co. has appointed the following dealers: Henry L. Metz, 1620 University avenue, Madison, Wis.; Keystone Motor Sales Co., Lancaster, Pa.; Royal Auto Sales & Service, 1749-55 Milwaukee avenue, Chicago; J. O. Burns, Motor Sales, 807 Chicago avenue, Evanston, Ill.; Gilbert-Hight Motor Co., Frankford, Philadelphia, Pa.; Tobin Auto Sales, New Washington, O.; Valley Auto Service Co., Parnassus, Pa.; Chas. Warford, Waterloo, Nebraska; E. S. Barlow, Hyannis, Mass.; Hoch's Garage, Duluth, Minn. and The Blue Ribbon Automobile Co., Columbus, O.

The Cruse-Crawford Manufacturing Company has acquired the franchise for the sale of Studebakers in Birmingham and Northern Alabama,

which it will handle in addition to the Willys-Knight and Overland cars.

The Davey Marmon Company, 11th & Locust streets, Des Moines, Iowa, has secured the state distribution for Case automobiles.

A. C. White, Iowa City, Iowa, becomes sole proprietor of the White-Lewis Motor Co. March 1, succeeding his partner, M. F. Lewis.

New Chandler dealers are: H. C. Walker, 323 W. Johnston street, Madison, Wis.; Luedtke Brothers, Racine, Wis.; Chandler & Cleveland Sales Company, 1104 Florida avenue, Tampa, Fla.; Isaacson Motor Sales Co., 3020 Broadway, Chicago and N. L. Laurie, Stryker, Ohio.

The Western Auto Supply Co., of Kansas City, opened this month a new southeastern branch in Atlanta, located at 187 Peachtree street. Paul E. Connor, of Kansas City, is in charge of the branch, which was formerly opened in mid February by Don A. Davis, president of the company.

The McCamey Motor Company of Portland, Oregon recently incorporated for \$25,000 are moving into new building at 116 So. Jersey.

The Sharman Auto Co. of Salt Lake City, Utah, has incorporated its business. The capital stock is listed at \$250,000 and the incorporators are: Sam. H. Sharman, president; Fred W. Sharman, vice-president; Francis R. Sharman, secretary; Cora M. Sharman and Frank T. Collins.

The Rhino Tire Co. has opened a tire store at 42 East Fourth South street, Salt Lake City, Utah. The company is incorporated for \$10,000, all common stock and fully paid. J. W. Anderson is president and treasurer, David R. Wenberg, vice-president and secretary.

After a complete redecoration of the premises the St. Louis Motor Car Co., Jordan and Kissel distributor, formally opened at its new location 3137 Locust street. The first floor of the building is devoted to the show and service room and the offices of the company are on the second floor.

Parks & Bohne, Inc., has removed from 205 North Twelfth street to its new \$40,000 building at 3132-36 Washington boulevard, St. Louis. The front of the new building is white tile and red dutch brick 50 feet wide by 115 feet deep.

Alfred Bevis has been awarded the St. Louis distribution of the Mercedes car. Mr. Bevis has arranged for temporary quarters at 4418 Olive street where he is now displaying the new Mercedes touring car.

The Osborn Auto Service Co. at 33rd and Highland Drive, Salt Lake City, Utah, has been purchased by N. C. Debenham and W. F. Bailey. A general garage, repair and accessory business is done.

St. Armand's Garage, Chicopee, Mass., has been designated as associated dealer for Chevrolet by A. V. Reopell, Springfield distributor.

The Newhouse Service Co., Springfield, Mass., has been appointed distributor for Dunlop tires in Western Massachusetts.

The Berkshire Motor Co., Garford truck dealer, has taken space for sales and service in the Kimball Garage, Springfield, Mass.

Dirden & Lackey Motor Co., 1908 State street, E. St. Louis, Ill., has been appointed Cleveland dealer in E. St. Louis.

The United States Tire and Rubber Co. has a new branch office in Salt Lake City, Utah, made necessary by increasing business. The company is now located at 160 Motor avenue.

Distribution of the Auburn car in the southeast has been placed with C. T. O'Ferrall, Richmond, Va., who will handle Maryland, Virginia, North Carolina, District of Columbia and a part of West Virginia. W. P. Dorrough of Jacksonville, Fla. will look after South Carolina, Florida, Georgia, Alabama, Mississippi, Louisiana and Tennessee.

Demars Bros. Motor Co., Washburn, Wis., Studebaker dealer, sustained a heavy loss by fire which destroyed its sales and service building and equipment store on Feb. 4. Four of twenty cars in the building were saved. A new, fireproof building costing about \$35,000 will be erected at once.

Articles of incorporation have been filed by the Badger Motors Co. of Rhinelander, Wis., organized with \$50,000 capital stock by J. Segers-trom, P. J. Dandonneau and L. H. Moore to deal in motor vehicles, provide service, operate a garage, etc. All have been connected with the business in Rhinelander for many years.

The Zeaman Motor Co., Chevrolet dealer at Wisconsin Rapids, Wis., will start work soon on the construction of a \$20,000 addition to its sales and service building, which will provide new display rooms as well as additional service facilities.

The Elmwood Motor Co., Pierce, Wis., is a

new corporation with \$50,000 capital, organized by C. K. Averhill, L. L. Wild and F. P. Springer to serve as dealer.

A charter has been granted to the Banner Motor Sales Co. of Milwaukee, Wis., capitalized at \$10,000, to deal in new and used cars, provide service, parts etc. and operate a garage. The incorporators are A. B. Haufschild, L. L. Traudt and F. G. Henrickson.

Matt Stark, 5501 Mound Avenue, town of Wauwatosa, Milwaukee county, Wis., will build a fireproof garage and service station, with filling station and equipment store 100 by 200 ft., costing about \$40,000.

The Mehlock Co., Oshkosh, Wis., has been incorporated with \$10,000 capital stock to manufacture and deal in automotive equipment of all descriptions. The incorporators are George R. Mehlmann, Elmer L. Wedlock and L. A. Wedlock.

The Kimball Garage, Springfield, Mass., is about to build an \$18,000 addition to its establishment, which when complete will provide a storage capacity of close to 1000 cars. The new building will join the two in which the company is now quartered.

W. E. Daykin, for many years a salesman for the Dubuque Rubber and Belting company, has resigned to join the staff of the Overland-Dubuque Co., distributors for the Overland and Willys-Knight in eastern Iowa territory. He will be sales manager.

Earl Bengston, 128-132 North First street, Rockford, Ill., has been appointed Winnebago county distributor for the Hudson and Essex cars.

Work commences March 1 for a new garage building, corner of Mulberry and Court streets, Rockford, Ill., to cost \$12,000. B. R. Lyddon is the builder. He expects to lease it to Howard V. Gleasman, distributor of the Hupmobile. Another new garage is to be built at the corner of Winnebago and Elm streets, Rockford, by H. J. Collins, C. H. Knapp and W. H. Barnes, to cost \$25,000.

George H. Pfund & Son, Lincoln, Ill., have leased the building at 607-9 Pekin street that city, and will distribute the Rickenbacker, Oakland and Maxwell cars in the Logan county territory.

New Nash dealers are as follows: Owens Valley Nash Sales, Bishop, Cal.; J. A. Way & Son, Ashland, Ill.; Yates & Thornton, Petersburg, Ill.; Barrow Motor Co., Gibson City, Ill.; Musgrave Motor Co., Chanute, Kansas; Poplar Nash Co., Minneapolis, Minn.; William Cook, Cobleskill, N. Y.; Nash Auto Sales, Bayshore, L. I., New York and the Conner Nash Co., Auburndale, Wis.

The National Motorist Supply Company has been organized at Peoria, Ill., and has opened a store at 633 Main street, to distribute motor vehicle accessories. The promoters include O. J. Cala and W. C. Argraves.

The Stahlheber-Wangelin Company, Mascoutah, Ill., has been incorporated with capital stock of \$20,000 and will distribute motor vehicles and supplies. The principals in the company are W. E. Stahlheber and H. G. Wangelin.

Stuart E. Rice and George W. Curtis have organized the S. E. Rice Motor Car Accessory Company, Rockford, Ill., and have opened a store at 225 South Main street. Capital stock has been fixed at \$50,000. It is proposed to manufacture and distribute motor vehicle accessories and parts.

E. C. Brunson, E. F. Whalin and E. C. Cully have organized the Morgan County Motor Company and have leased the garage of Howard Zahn at 221 East Morgan street, Jacksonville, Ill. Capital stock has been fixed at \$20,000.

The Mack International Motor Truck Co. has moved to new quarters at 161 Motor avenue, Salt Lake City, Utah. Officials of the company here say the company intends to make this city the future distributing center of the mountain country and to erect a building.

Recent new automotive firms in the Southeast include the following: Cleveland Motor Co., Monroe, La., \$50,000 capital; Prater-Saeger Motor Sales Co., Chattanooga, Tenn., \$50,000 capital; Acme Motor Co., Erwin, Tenn.; Wylie Motor Co., South Pittsburgh, Tenn., \$30,000 capital; Blythe Motor Co., Wilson, N. C., \$100,000 capital.

A meeting of all Moon dealers in St. Louis and in the surrounding territory was held in the showroom of the retail sales department of the Moon Motor Car Company, St. Louis, recently for the purpose of a friendly get-together and to discuss sales plans. It was addressed by Neil E. McDarby, assistant sales manager, who spoke on the sales promotion, and George H. Kublin, chief engineer.

The Wofford Oil Company, distributors of Woco-pep, held a contest among the filling stations in the territory, offering prizes to the filling stations draining the largest number of crank cases during a certain length of time, and filling them with Woco Motor Oil. Meyers and Apperson Woco Service Station in Birmingham won the first prize.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Allentown, Pa.	March 1-8	Lehigh Automobile Trade Association. E. T. Satchell, President.
Bethlehem, Pa.	March 23-29	Lehigh Valley Automobile Show.
Bloomington, Ill.	March 5-8	Bloomington Automotive Trade Association.
Boston, Mass.	March 8-15	Boston Automobile Dealers' Association and the Commercial Motor Vehicle Association, Chester I. Campbell, Manager, 5 Park Square.
Burlington, Vt.	April 2-5	Ethan Allen Club, Thomas W. Parkhill, Chairman.
Calumet, Mich.	April	Central Storage Co., Jos. A. Savini, Manager.
Camden, N. J.	March 3-8	Camden Automobile Trades Association, M. T. Ivins, Manager.
Charlotte, N. C.	March 3-8	Charlotte Automotive Trades Association, George E. Wilson, Chairman.
Denver, Colo.	March 11-15	Denver Automobile Dealers' Association, F. F. Vic Roy, Manager.
Duluth, Minn.	March 17-22	Duluth Automotive Dealers' Association, A. R. Kent, Secretary.
Fairmount, W. Va.	March 4-8	Annual Show Under Direction of Fairmount Automotive Assn., T. L. Cordray, President.
Fort Worth, Tex.	March 8-15	FortWorth Automotive Dealers' Association.
Goldshoro, N. C.	April 21-26	Chamber of Commerce, W. C. Denmark, Manager.
Great Falls, Mont.	March	Montana Automobile Distributors' Association, Lyman E. Jones, Manager.
Green Bay, Wis.	Aug. 25-30	Automotive Division, Association of Commerce, W. F. Kerwin, Manager.
Greenwich, Conn.	March 11-16	Battery F., N. Y. N. G., A. R. Kent, Manager.
Indianapolis	March 3-8	Indianapolis Automobile Trade Association, John B. Orman, Manager.
Johnstown, Pa.	March 1-8	Johnstown Automobile Dealers' Association, J. H. Leppert, Chairman.
Kingston, N. Y.	Mar. 6-8	Kingston Automotive Dealers' Assn., M. T. Southard, Secretary.
Logan, Logan Co., W. Va.	Mar. 10-15	Logan Automobile Dealers' Assn., P. L. Brothers, Chairman.
Milwaukee, Wis.	Aug. 25-30	Milwaukee Automotive Dealers' Association, Fall Show, Bart L. Ruddle, Manager.
Mitchell, S. D.	April 17-19	At the Corn Palace, directed by P. M. Young.
Muskegon, Mich.	March 4-8	Muskegon Automotive Trade Association, J. C. Fowler, Manager.
Niagara Falls	March 3-8	Niagara Falls Motor Trades Association.

New Orleans	March 31-April 4	Spring meeting of the Automotive Equipment Association.
Oklahoma City, Okla.	March 24-29	Oklahoma City Motor Car Dealers' Association, E. T. Bell, Secretary.
Oswego, N. Y.	March 19-22	Oswego County Automobile Merchants Association, J. S. Ayres, Secretary.
Reno, Nev.	June 2-9	Nevada State Automobile Exposition.
Richmond, Va.	March 8-15	Richmond Automotive Trade Association. J. A. Kline, Chairman Show Committee.
Sacramento, Cal.	Sept. 1-10	State Agricultural Society, C. E. Paine, Manager.
Saginaw, Mich.	March 4-8	Saginaw Automobile Dealers' Association, Guy S. Gauber, Manager.
Sioux City, Iowa	March 3-8	Motor Trades Bureau, Harrison Wilbourne, Secretary.
Springfield, Mass.	March 3-8	Springfield Automotive Dealers' Association, Harry W. Stacy, Manager.
Terre Haute, Ind.	Feb. 25-March 1	Terre Haute Automobile Dealers' Association, A. E. Kress, Secretary-Treasurer.
Toronto, Ont.	Aug. 23-Sept. 6	Canadian Automotive Equipment Association and the Automotive Industries of Canada, Gib Robertson, Secretary.
Washington, D. C.	March 8-15	Washington Automotive Trade Association, Walter Lambert, Secretary.
Washington Hgts., N. Y.	March 26-31	Washington Heights Automobile Dealers' Association, H. G. Stiles, Manager.
Yonkers, N. Y.	March 3-8	Automobile Merchants' Association of Yonkers, Callahan and Partlan, Managers.

CONVENTIONS

Albuquerque, N. M.	May 26-31	U. S. Good Roads Exhibition.
Galesburg, Ill.	March	Annual Convention of the Illinois Automotive Trade Association.

RACES

Altoona, Pa.	June 14	A. A. A. 250-Mile Speedway Event.
Fresno, Cal.	April 24	A. A. A. 150-Mile Speedway Event.
Frisco, Cal.	Oct. 4	A. A. A. 150-Mile Speedway Event.
Indianapolis	May 30	A. A. A. 500-Mile Speedway Event.
Kansas City	July 4	A. A. A. 250-Mile Speedway Event.
Kansas City	Oct. 19	A. A. A. 250-Mile Speedway Event.
Los Angeles	Nov. 24	A. A. A. 250-Mile Speedway Event.
Syracuse, N. Y.	Sept. 1	A. A. A. 100-Mile Speedway Event.

The READERS' CLEARING HOUSE

Questions & Answers on Dealers' Problems

Alcohol in the Crankcase to Prevent Stoppage of Oil Circulation

Q—During the past weeks of very cold weather we have experienced a lot of crankcase dilution, also freezing, which in a number of cases has caused the connecting rods and main bearings to burn out. In every instance we have found more water in these crankcases than ever before in our experience, which covers 14 years in this business. After having experienced this trouble for some time we have kept a very careful check on oil, having changed it every 250 miles and sometimes more frequently.

We have used Veedol, Mobiloil A and Arctic, Polarine light and Texaco light, and find the same condition prevails in every case. After a run of a few miles, with the motor left idle in the cold, before starting, the oil pump refuses to function and upon examination it is found that ice in the crankcase has stopped circulation and in engines that have full pressure feed through the crankshaft, water has frozen in the crankshaft passage causing the expansion plug or screw placed therein by the builder to be forced out into the crankcase resulting in burned out bearings.

This condition seems to be worse this year than ever before and any advice you may be able to give us will be greatly appreciated. We are loath to admit we are unable to cope with this condition, but such is the case and we are very much concerned in finding a remedy.—C. G. Riley Motor Co., Lancaster, Ohio.

We are indebted to one of our subscribers in Canada for a suggested remedy. This is to put about $\frac{1}{2}$ cup of denatured alcohol in with the crankcase oil. This measurement is somewhat indefinite and the amount will need to be varied with the crankcase capacity, so that some experimentation may be required.

Engineers of various oil companies do not concur in this recommendation, although they admit it is effectual as a last resort. The objection to the use of alcohol seems to be based on its action in forming an acid which will attack the crankshaft and other exposed steel parts of the engine. Our personal preference would be to take a chance on the detrimental effects produced by alcohol, and then as soon as the cold snap is past, drain out the oil and proceed as formerly. The recommendation of oil companies is to use a heavier oil, such as the oil recommended for summer use, as this does not absorb water as much as the lighter oils. This means, of course, that care would be essential in starting up to allow time for the engine to become heated so that the heavy oil would flow to the bearings.

REPLACING LIGHTING PLANT ENGINE WITH AUTOMOBILE ENGINE

Q—we have a Genco lighting plant, (30 ampere) the engine and radiator being worn out and we thought that rather

The Readers' Clearing House

THIS department is conducted to assist dealers and maintenance station executives in the solution of their problems.

All questions are answered direct by letter, so the name and address should be given in full. This saves waiting for the answer to be published, which sometimes occurs several weeks late, depending upon the space available.

Readers' names will not be published with articles, if a request to this effect is received with the letter.

Inquiries not of general interest will be answered by personal letter only. Emergency questions will be replied to by letter or telegram.

Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been made and these are answered by reference to previous issues.

Addresses of business firms will not be published in this department but will be supplied by letter.

Technical questions answered by B. M. Ikert, P. L. Dumas and A. H. Packer; Legal, by Wellington Gustin; Paint, by G. King Franklin; Architectural, by Tom Wilder; Tires, by a Practical Tire Man; General Business questions, by MOTOR AGE organization in conference.

than go to the expense of repairing the engine and radiator we would use a Lycoming 4-cylinder engine for driving the generator. Do you think that this 4-cylinder engine would be more expensive in operation than the single cylinder Genco would be? What speed would you recommend for 4-cylinder engine? The generator must travel 1800 r.p.m. and is now direct connected. We were figuring on running the generator four times the speed of the engine so that the engine would turn over 450 r.p.m. and we were figuring on reversing both transmission shafts which would give us a 4 to 1 ratio. Do you think this would be advisable?

We will not belt drive the generator as we are afraid the generator bearings would not stand up. Do you think that the transmission gears reversed in this way would be noisy? Would rather run it with a noiseless chain but do not know where we could get the sprockets that would be suitable for this work.—Eggers Garage, Robert Leischner, Gettysburg, S. D.

The four cylinder engine will probably be less efficient than the single cylinder engine for it will have to run at partly open throttle. Nine hundred r.p.m. would be suitable for this engine, and we favor pulley drive, using a countershaft mounted on ball bearings. The countershaft would be direct coupled to the generator and the ball bearings on the

countershaft would take the strain of the belt pull, so that the plain generator bearing would not be worn excessively.

Another possibility is replacing the plain bearing of the generator at the pulley end with a ball bearing. We feel that the transmission drive proposition would be unsatisfactory and would be noisy.

The silent chain drive would perhaps be better than the belt drive as the pull on the bearing would be less and source of supply on chain and sprocket will be given by letter. The sprocket on the generator should have half as many teeth as the sprocket on the engine.

LUBRICATION OF 1921 WINTON

Q—Supply oiling diagram of the engine of a Model 21 Winton Six. This car has an electric starter, left hand steer, and the oil reservoir is on the right side of the engine.—E. C. Root, St. Anthony, Idaho.

A—We have no diagram available but the oiling system operates as follows:

Oil is pumped to each main bearing and passes through the crank shaft to the connecting rod bearings. Returning oil settles at the bottom of the crankcase and overflows to a small oil pump, which returns the oil to the main tank, where it is filtered before being used again.

To regulate the flow in the oiling system, there is a line running from the oil header to the oil tank, this line being equipped with a cock. When this cock is closed, (at right angles to the pipe) the greatest possible volume of oil is delivered. When the cock is a trifle open, some of the oil flows from the pump to the header and is by-passed into the tank. This reduces the quantity passing to the various bearings. The farther the cock is open, the less the amount of oil flowing to the bearings. The capacity of the cock is not sufficient to reduce the flow of oil entirely, should the cock be left wide open.

CHANGING WIRING FOR GROUNDED SYSTEM

Q—I am enclosing a diagram of car wiring of the General Electric genemotor which I received from you some time ago. I desire to change this from a double to single wire system. Would this be possible by grounding generator negative, relay and battery negative or what would you suggest?—Robert H. Ludington, Woodstock, Ont., Canada.

To change to a single wire system you will ground each negative wire of the system, this will include the battery, relay, motor generator and the negative side of the headlamps and side lamps.

A Small Garage for a Large State

Q—I have a corner lot size 50x120 ft. in a town of 400 population, on which I wish to build a drive-in filling station with a small shop about 40x50 ft. Please send me some suggestions for making it as attractive as possible without a great expense.—J. R. Boyd, Menard, Tex.

We have allowed 42 ft. of the front of your lot for a drive-in filling station. This will give you space for four cars at a time with four cars waiting, so that there will be slight danger of having to turn customers away.

Instead of a 40x50 ft. shop we have laid out one 50x50 ft., this being the better size and more adaptable to shop use. You will, no doubt, want a small accessory store and office in connection with the filling station and if this was taken from the 40x50 ft. space, the shop would be too small to handle cars.

We have arranged a small bench near the front car entrance so that it will be convenient to give cars quick service while they are waiting at the filling station or if there is enough work to warrant, they may be driven just inside of the front door.

ONE GOOD ANSWER DESERVES ANOTHER

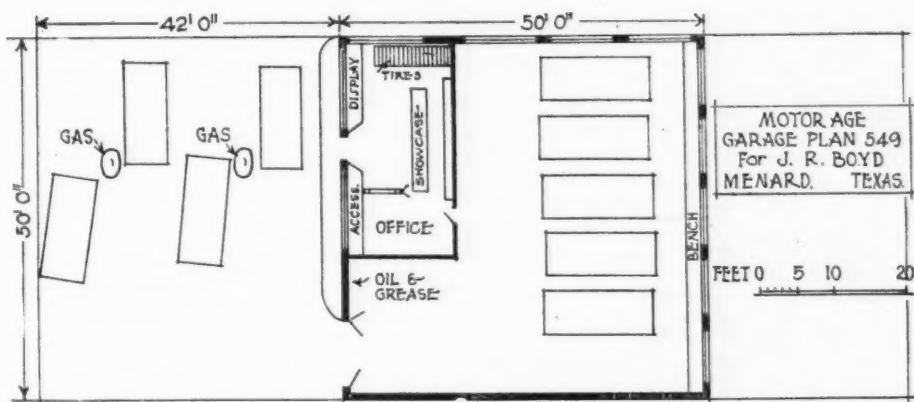
Q—Your answer to my recent inquiry was useful and valuable and I now will ask you another if it is not tormenting you too much. In adjusting connecting rod bearings of Oldsmobile 8 of 1917 type, what is the proper method of doing the work and clearance to have in bearing?—Service Garage, Lane, S. Dakota.

1—Before any work is started on the bearings of this engine it is well to bear in mind that the straight rod is adjustable and is provided with one shim .002 thick in the parting halves to take up the play. The straight rod is adjustable, therefore, but the rod that carries the bushings proper, which rides on the crank pin, is non-adjustable. If you should attempt to eliminate the up and down play by filing the cap or brushings of the inner bearing you will find that it will throw the rod out of circularity and the job will be spoiled.

The procedure in fitting a new set of connecting rod bearings is no different than on the average engine, with the exception of the clearances and the necessity of circularity on the outside of the bronze back bushing. The recommended method is to first get the crankpins perfectly circular and smooth without any eccentricity. Then secure a set of new bearings and ream them to a size one to one and a half thousandths larger than the diameter of the crankpin.

The new bushings, when you receive them from the Oldsmobile company, when placed together will be perfectly circular on the outside and the only caution that must be observed here is to see that the rod which rides on the back of the bushing has at least .002 clearance. For your guidance we are sending you a reprint of a pamphlet entitled "How Engine Bearings Should Be Fitted."

2—Please tell me the allowance to leave



Architectural Service

IN giving architectural advice, MOTOR AGE aims to assist its readers in their problems of planning, building and equipping, maintenance stations, garages, dealers' establishments, shops, filling stations, and, in fact, any building necessary to automotive activity.

When making request for assistance, please see that we have all the data necessary to an intelligent handling of the job. Among other things,

we need such information as follows:

Rough pencil sketch showing size and shape of plot and its relation to streets and alleys.

What departments are to be operated and how large it is expected to be.

Number of cars on the sales floor.

Number of cars it is expected to garage.

Number of men employed in repair shop.

How much of an accessory department is anticipated.

in new step-cut rings and valve stem clearance.

2—The recommended clearance for step-cut rings varies with the individual make but, as a general rule, .002 per in. of cylinder bore will be the maximum and the minimum in the neighborhood of one and one-half thousandths. In other words, the maximum for 3 inches would be .006 and the minimum .0045. For fitting rings it is always advisable to allow the maximum clearance on the top ring, as it is the one that is of the highest temperature during the operation of the engine.

In speaking of valve stem clearance, we assume that you refer to the diametrical clearance between the valve stem and valve guide. The ideal diametrical clearance is .0015, on in other words 1½ thousandths of an inch.

3—In the E45 Buick what kind of bearing is used in the forward end of the driveshaft in torque tube. How is it removed and renewed?

3—We assume you refer to the extreme forward end of the shaft. If so, we wish to advise that there is no bearing at this end. The forward end of the driveshaft proper is supported by the universal joint, and immediately behind the joint is an oil retaining felt washer, the only removable part in the front end of the driveshaft housing or torque tube.

4—Beside the Frontenac, what cars have the Chevrolet Bros. had any connection with manufacturing or designing? Did they do anything of any credit in war implements in the recent war?

4—Louis Chevrolet was credited with the design of the four-cylinder Monroe stock car and the American Six. Previous to this he was engaged with the original Chevrolet Motor Company as a designer, at a time before the General Motors took over the Chevrolet unit. Regarding war work, we do not have any information and suggest that you communicate with the Chevrolet Bros. direct at Indianapolis, Ind.

A READER'S SUGGESTION

In the January 3rd issue of MOTOR AGE Mr. M. B. Keith of New Canaan, Conn., describes his trouble with a water leak in his Marmon 34. You diagnose the trouble as a cracked cylinder head or leaky valve guides. I will gamble you a dime, all or any part of it, that he has a leaking cylinder sleeve. The description sounds suspicious and I understand that the aluminum block with pressed in sleeves was abandoned by the Marmon Co. in favor of a solid casting because of unequal expansion which loosened the sleeves and allowed water to leak down into the crankcase. If Mr. Keith has trouble of this kind he might locate it by removing the crankcase and examining the lower ends of the cylinder barrels carefully. Yours truly, J. E. Gibby, 145 E. Chillicothe avenue, Bellfontaine, Ohio.

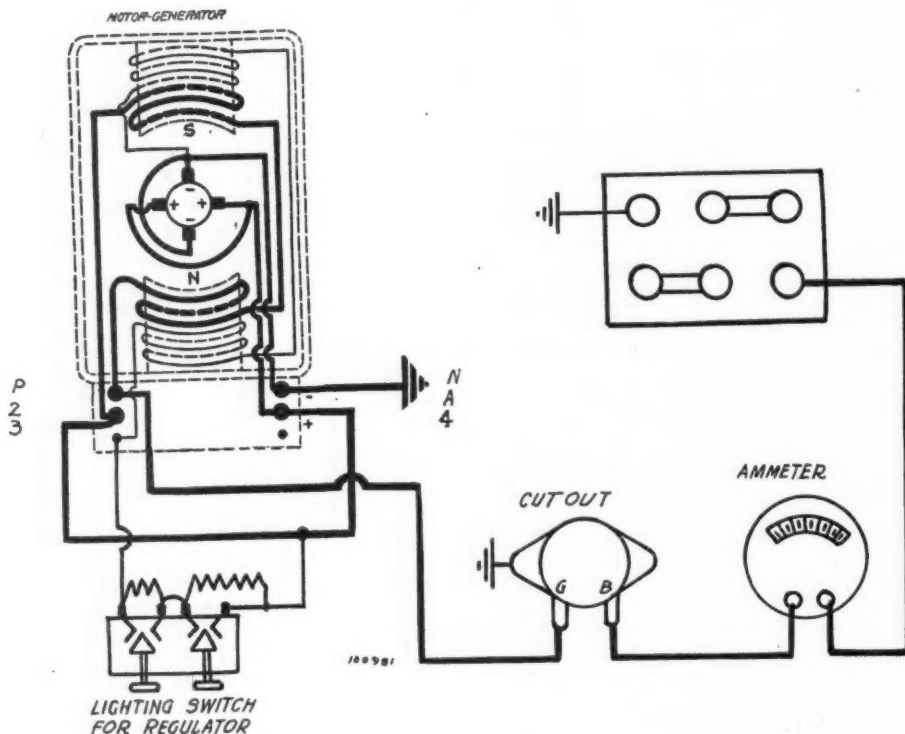
Note—The suggestion submitted by Mr. Gibby is entirely probable and in giving the diagnosis on this Marmon we overlooked the fact that it was of a model carrying the removable sleeve. We thank you for your cooperation.

PREVIOUS ISSUE EXPLAINS AMMETER ON COLE

Q—I would like to be informed as to how to put on an ammeter on a 1914 Cole car. The number of the car is 14210; model No. 666. This car has the mercury regulator tube removed. The wire leading to the mercury regulator has been grounded to the frame and I have no means of cutting in to make the ammeter work. Also, I am unable to use the cutout relay. Will you send me a blueprint in order that I may correct the trouble? Will you send me a wiring diagram that will enable me to use a manually controlled resistance instead of a mercury regulator for the Cole and Cadillac motor cars.—John Holmes, care of Decatur Lumber & Mfg. Co., Decatur, Ill.

The answer to your question was printed in the January 10th issue of MOTOR AGE. We are sending you a copy of the material that was printed in the issue mentioned.

Charging Batteries With Old Chalmers-Entz Generator



Q—We have an 18 volt generator from a 1916 Chalmers and wish to use this for charging batteries. How much amperage can we get and how much voltage—and how should this machine be connected for best results?—Washburne Garage, Washburne, Texas.

A—We are showing a wiring diagram in which the battery, ammeter, cutout and regulating switch are used. Instead of the one battery shown in the circuit you can have 2 or 3 six-volt batteries connected in a series.

The regulator is a simple two-gang lighting switch connected as shown with two resistance coils in the back. These

coils may be made of iron or nickel wire, and one should be twice as long as the other. The machine will develop 18 volts or less, depending on the batteries connected.

With more than one battery it may be undesirable to use the cutout for the shunt winding will be overloaded and may overheat. Instead of the cutout however, you could install a simple switch which would doubtless be satisfactory. On the other hand you could use a 12 volt cutout, if normally you had two 6-volt batteries on charge.

A FEW TIPS ON THE OILING OF THE 1917 OLDSMOBILE

Q—We are sending our subscription to Motor Age for one year. We are also sending the questions back as they are of no value to us. The Oldsmobile that we inquired about hasn't a hollow crankshaft. The oil pump works from the camshaft at the rear cam bearing. The oil pump isn't in the oil pan. The model of this car is 37 T. We have also learned that this car was driven 12 miles with No. 6 bearing burnt out. If you can send us any other information please do it at once.—Queen & Holbrook, Detroit, Mich.

The 1918 model Oldsmobile 37T carries a drilled crankshaft. If the engine that you have does not have a drilled crankshaft it is a 1917 model, built early during the year of 1917, as the cars during the latter part of 1917 carried the drilled crankshaft. We would advise that you first check the amount of dip of the connecting rods, as it is possible that the oil pan troughs have been deranged through bending and removal of the crankcase lower half. Each rod should have $\frac{1}{8}$ -inch dip.

Would also suggest that the distributing pipe which furnishes oil to each trough be examined to see that the outlet or small hole in the pipe for each trough is free and unobstructed.

Also examine carefully the oil pump, as we understand from the Oldsmobile service station here in Chicago that the pump is so constructed that in the event that any foreign matter or dirty oil should clog up holes in oil pipe, the oil pump plunger automatically stops pumping oil, due to a ball check valve in top of plunger. If the pump on the model that you have has this ball check valve in the top, we would advise that you close it, that is, put it out of commission by soldering the ball.

You will note that the plunger contains a spring and two balls. The ball at the upper portion of the pump which is nearest to the outlet pipe to the distributing line should not be disturbed, but beneath it you will find another ball that operates in the end of the pump plunger proper. Behind this ball you will find a spring which is supposed to keep the ball seated,

but in case of an obstruction in the line which would produce high pressure, will allow a by-passing effect and, of course, automatically reduce the pressure.

The remedy is to solder the ball securely to the upper portion of the plunger and eliminate the pressure escape path entirely. With the exception of this and an examination of the distributing line holes, there is nothing further that should produce chronic loosening of the bearings.

If you refer to the Dec. 27th issue of Motor Age you will find that an illustration is given of the pump referred to, in this case, however, it is installed on an Oakland 1917, which of course used the same model of Northway engine. As before stated, your car is a 1917 model and not a 1918.

TIMING ON SEVERAL MODELS OF WHITE ENGINES

Q—Give information on the valve and ignition timing, in degrees on the flywheel, for the following White engines: G. K., G. N., G. O. and G. R. models. We have seen two different diagrams for each of these engines and the men who had these two different diagrams each claimed his own was the correct one.—F. L. Tighe, Baltimore, Md.

On all of these engines the timing of both valves and ignition should be quite simple, for the engines are of the L-head type where, except for wear, it is only necessary to time one valve. The exhaust valve should close on upper dead center and at the same instant the spark should occur with the lever in the retard position.

The exact valve timing on models G. K., G. N. and G. O. is as follows: Exhaust opens 50 degrees before bottom dead center and closes on top dead center. Intake opens 5 degrees after top dead center and closes 40 degrees after bottom dead center. On model G. K., 1 degree equals $\frac{9}{64}$ inches measured on the circumference of the flywheel. On models G. N. and G. O., 1 degree equals $\frac{5}{32}$ inches as measured on the circumference of the flywheel.

This information was obtained from the White dealer in Chicago and the exact information on model G. R. was not available, although it was said to be practically the same as on the other models.

OIL SCRAPING RING NEEDED

Q—We have a 1924 Dodge car which has run 5000 miles and is now pumping oil. We have used light, medium and heavy oil and they all work about the same. The pistons seem to fit properly and the rings are in good condition. The engine operates all right for 300 or 400 miles and then the spark plugs begin to foul up.—Warner's Garage, Osawatomie, Kansas.

A—This is an unusual condition in a car which has only run 5000 miles. However, you can doubtless overcome the condition by installing some good oil scraping piston rings, in the lower ring groove of each piston. Before putting the new ring in place, six $\frac{1}{8}$ in. holes should be drilled through the pistons at the center of the lower groove. These holes should be equally spaced around the piston.

Wiring of 1922 Stephens

Q—Send wiring diagram for rewiring a 1922 Stephens, also give me the size of wire best suited for this job.

1—A diagram which you may use for reference in rewiring the car is shown. The recommended wire sizes are as follows: No. 0 wire for starter to battery connections. No. 10 for main lighting circuit, that is from ammeter to switch and from the switches to head lamps, etc. No. 14 for circuits that require little current such as side lights, tail lights, instrument board lights, etc.

2—Can you advise me maximum speed of this motor, also speed of car and what h.p. it will develop? It is a sport model 4-passenger car.—Campbell Garage, Hatton, Washington.

2—According to h.p. curves supplied by the Stephens Company the engine of a 1922 model delivers 58 h.p. at 2700 r.p.m. The maximum speed of the engine is in the neighborhood of 3100 r.p.m. The average run of Stephens stock cars will show a little better than 65 m.p.h.

OILING ON OLDSMOBILE AND WILLYS-KNIGHT

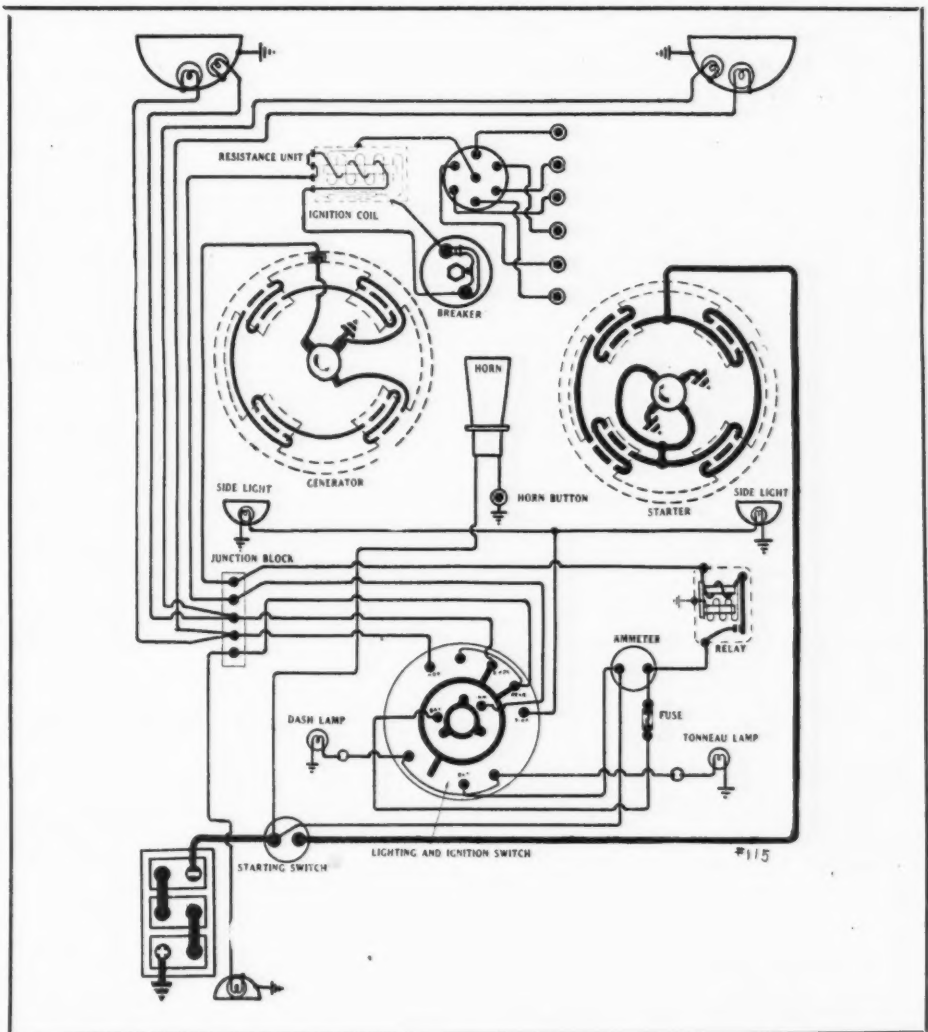
Q—Furnish us with diagrams of the oiling system of the 1923 4-cylinder Oldsmobile and Willys-Knight Model 88-4. We are interested in the method of regulating the oil pressure on these systems.

1—We have no diagrams on these cars which would be of any assistance. On the Oldsmobile, a gear type pump forces oil to the main bearings and it then flows through the crankshaft to the connecting rod bearings. There is no adjustment to regulate the pressure.

On a system of this kind, the pressure will be high when the oil is cold and heavy and will be lower when the oil is thin. High pressure will also be produced if the bearings are tightly fitted while loose bearings will give a lower pressure.

On the Willys-Knight, the system is similar except that a plunger pump is used and a by-pass is provided for the oil, so that at low speeds some of it can return to the crank case.

The operation of the by-pass valve is taken care of by means of a connection with the throttle. At high engine speed or wide open throttle, the passage of oil through the by-pass is reduced so as to force more oil to the bearings at



high speed. Permissible pressure on the gage is from 2 to 15 lbs., and if the engine does not seem to have enough oil pressure, it may mean that the main and connecting rod bearings need tightening. With force feed oiling, however, bearings should never be as tightly fitted as with a splash system.

2—Supply wiring diagram of the lighting system on a Model 18 Chalmers.—W. B. Johnson, Prop. Norris Garage, Norris, Mont.

2—Wiring diagram is shown, in accordance with your request.

EXCESSIVE USE OF CHOKER MAY WASH ALL OIL FROM VALVE STEMS AND GUIDES

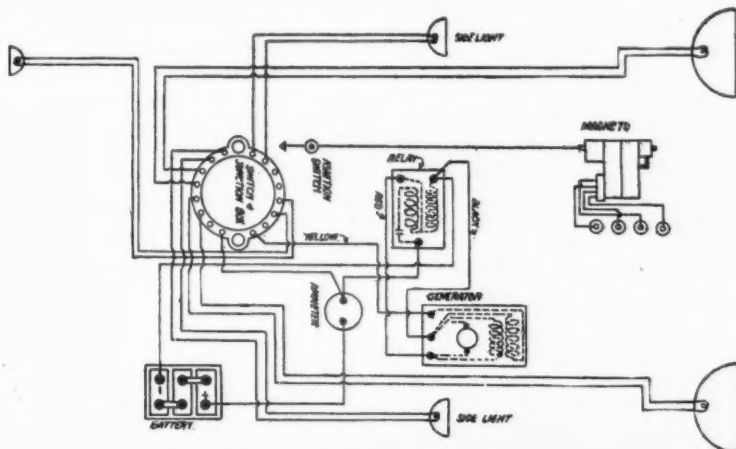
Q—We have a 1923 model Dodge roadster that has been driven between 2000 and 3000 miles. It has a knock similar to a valve tappet knock.

We have installed new pistons and piston pins, also piston rings, have put in a new fiber timing gear and new valve guides, also lifters, but none of these changes have eliminated the trouble.—J. H. Bishop, Dyersburg, Tenn.

There is a possibility that the car has been operated by someone who uses the choker excessively or drives with the choker in operation so that the car continually gets too rich a mixture. This may result in fuel working down past the valve stems and destroying the lubrication so that the valve stems become cut and worn.

While you say that you have replaced the valve guides, there is a possibility that the valve stems are not a good fit in the guides. You can test for this by running the engine and then holding the valves sideways, one at a time, with a screwdriver. It may be that turning the valve spring around will either produce or reduce the noise if it is due to valves.

If the trouble is not in the valves we have no specific suggestion to offer and would refer you to our list of engine knocks, where we list some 34 possible causes. A copy of this list is being sent to you.



Wiring of Model 18 Chalmers

Wiring Manual Needed in Every Electrical Department

Q—Can you give us information in regard to some electrical guide on generators and starters that will explain where all the leads are connected, also the amperage the fields should draw on a test when O. K., and if they should be grounded. Also information that will state whether any brush holder should be grounded and that will give the amperage the armature should draw between segments and how many amperes the generator should draw when operating as a motor?

Also state what speed the generator should run on different cars in order to set the charging rate properly when testing on the bench. We have been doing electrical work in connection with our garage work for years with success in most cases, except some we have had to send in for repairs. Now we figure on putting in a test bench and would like to get more detailed information so as to handle all jobs.—J. C. Janish, Waubay, S. D.

A manual of wiring diagrams will give

you a good deal of the information you request. For example, the information as to whether the field should be grounded or not and as to whether certain brush holders should or should not be grounded can be determined by looking at the wiring diagram in one of these manuals, for they show both internal and external circuits.

You will not be able to get the exact current that the armature should draw from one segment to another but a wiring manual will give usually the field current and also the motoring current. They also give the generator output at various speeds. Names of concerns publishing such wiring manuals will be given by letter.

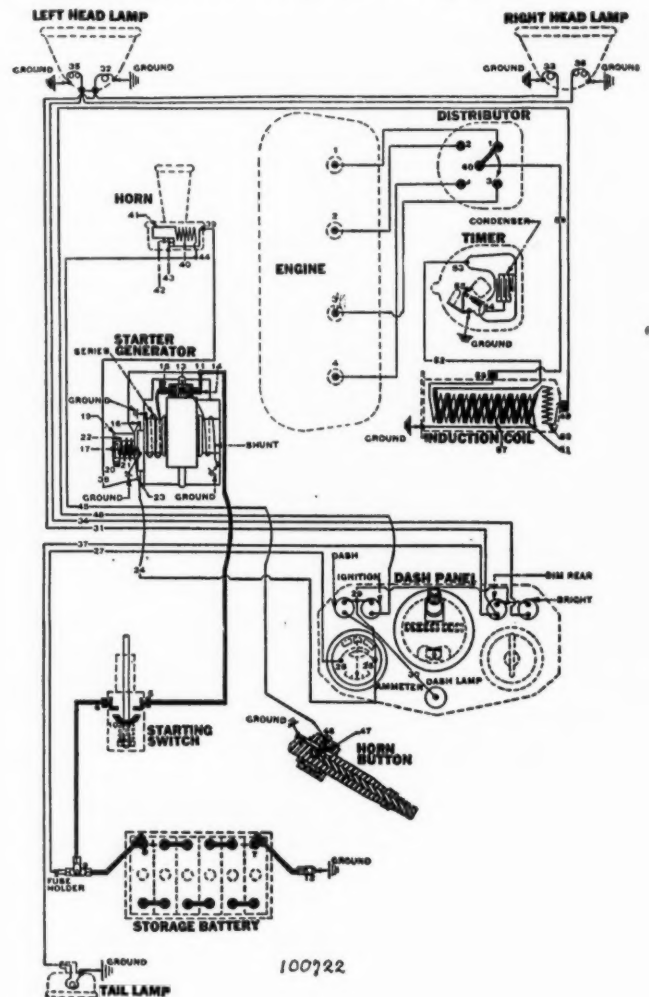
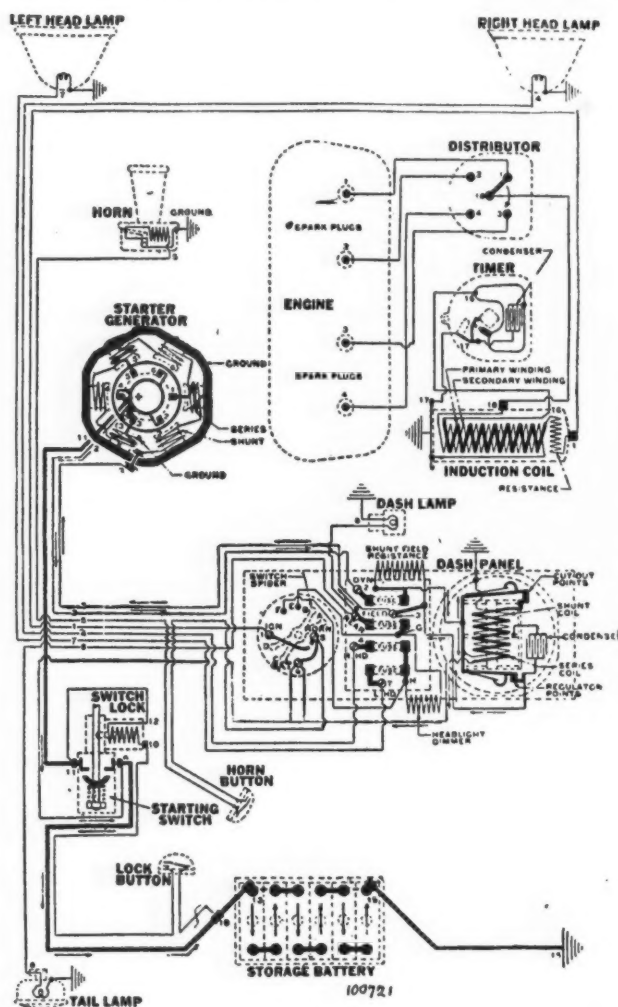
EFFECT OF THROTTLE OPENING, RUNNING AND STARTING

Q—Does a car at low engine speed draw more gas with open throttle than at high engine speed with same throttle setting?

If so, why can an overprimed motor be started by opening throttle where otherwise it seems to be impossible to get a shot out of it?—Square Deal Auto Co., Freeman, S. D.

The effects of throttle opening when cranking are entirely different from the effects of the throttle opening when the engine is running under its own power under load and no load. Generally speaking, when cranking an engine the greatest vacuum is created on the fuel through the nozzle with the throttle just slightly open. On account of the small opening, the velocity of the air through this orifice is increased and, of course, draws mixture more readily than if the opening were larger with the same vacuum. With the throttle wide open at cranking speed the velocity of the mixture is reduced so that an engine cannot be started easily. With the throttle wide open you draw in an excess of air as the larger area does not lift a proportionate amount of gas up through the manifold to the combustion chamber.

The Maxwell Twins—1918 and 1919 Wiring Are With Us Again



Q—Will you publish a wiring diagram for a 1919 Maxwell, also showing the starting switch wiring? Would the generator burn up if we changed from a 12 volt to a 6 volt battery without changing the generator?

1—We are showing two wiring dia-

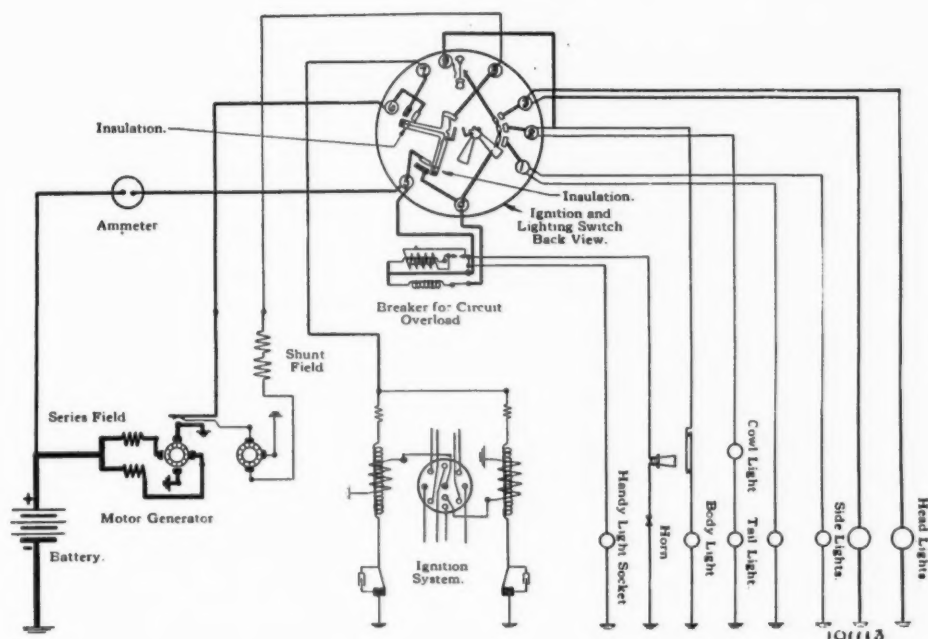
grams, one for the 1918 Maxwell and the other for the 1919. In either case however, you will have to use a 12 volt battery for, even if no generator trouble would be encountered with a 6 volt battery, you would not be able to use

the machine as a starter for it would not have enough torque to crank the engine.—Glen E. Singer, New Castle, Pa.

2—What is the wheelbase of a 1919 Maxwell

2—108½ inches.

This Car Has a Sense of Humor—It Winks Its Lamps



Q—We have a Lincoln car on which we are having trouble with the electrical system. With the lights turned on and the engine running fast enough so that the ammeter reads about zero, the lights flicker and the ammeter reading is unsteady. The lights have never burned out or given any trouble and the battery is fully charged, and all connections are clean and tight. We have tried another battery from another Lincoln car, but it does not help any. The owner says the lights have always acted that way.—Sam Shankle, Long Beach, Cal.

A—We are showing wiring diagram of the Lincoln car to assist you in locating source of this trouble, which appears to us to be due to a loose connection. Terminal No. 5 on the back of the lighting switch is connected through the ammeter to live battery. Terminal No. 4 is also a live battery connection but gets current through the circuit breaker.

We would suggest connecting a wire from the No. 5 to the No. 4 terminal so as to short out the circuit breaker. Then run the engine as you have done before and see if the lights flicker. If they do not it shows that the trouble was in the circuit breaker. If this does not locate the trouble, take a six-volt test light and connect it to the battery terminals.

This test should be made with the engine running and the lights flickering as you describe. If the test light connected at the battery does not flicker, then connect it from a live battery terminal to the frame of the car. Next connect it from the ammeter to the frame of the car, first at one ammeter terminal and then at the other. Then connect from the No. 5 terminal to the frame of the car and then at other terminals on the back of the lighting switch.

If the trouble is due to a poor connection you should find a place where the test lamp flickers while at a previous connection it did not flicker. The location of the trouble will then be in

between these two points where the test has been made, but where the results were different.

In the operation of the motor generator there is a switch connection made when the starter pedal is released and it occurs to us that this switch may be making poor contact. We believe that testing as above indicated should enable you to locate the cause of this condition.

ONE PLACE WHERE A DRAG DOES NO GOOD

Q—We have a model N 1917 Hupmobile on which it is difficult to shift gears until the engine oil becomes thoroughly warmed up. We are using as light an oil as possible, and although this helps some, it does not entirely overcome the trouble. It seems to us that if we could get a little more action on the clutch so as to pull the clutch plates further apart when the clutch pedal is depressed, that it should help in shifting the gears. Have you any suggestions?

1—The only remedy on this old model is to leave out one clutch plate, but unless you are overhauling the engine it would be inadvisable to undertake this work on this old car. It is advisable, when possible, to allow an engine to warm up before using it and we would suggest that you leave the car as it is and use it as best you can.

2—Send a wiring diagram showing how to install a manually controlled resistance instead of a Mercury regulator on a 1914 Cadillac.

2—We are mailing you a portion of page 44 of the September 28, 1922, issue of MOTOR AGE which gives an article and diagram in regard to making this change.

3—Could an ordinary type of vibrating voltage regulator, such as the Ward-Leonard, be used instead of the Mercury Tube? If so how should it be connected in circuit?

3—Replacement vibrating type regulators are on the market and the name of a concern making one of these will be

given by letter. They will also doubtless be able to give a diagram of connections, but if not we will be glad to do so. On this old car, however, the more simple type of manually controlled regulator might be more satisfactory.

4—Will you send me the following pages from MOTOR AGE which give instructions for building test bench and ignition test outfit:

Page 23 May 24, 1923.

Page 24 April 19, 1923.

4—These are being mailed to you.

Changing Connections to Reverse Armature Rotation

5—In the G-K Armature, shown on page 47 of your Dec. 6, 1923 issue, how should the armature coils be connected to the commutator in case you wanted to reverse the direction of armature rotation?—H. J. Lakevold, Fullerton, Calif.

5—Two diagrams were shown. In the one at the left one coil went from bar 28 to bar 11 and the other coil went from bar 29 to bar 12. This was an advance or pitch of 16 bars. If we had started at bar No. 1 and advanced 16 bars we would have come to bar 17. Advancing 16 bars starting with 17 would bring us around to bar 33, which is one back from No. 1. This means that the winding is retrogressive for it drops back a bar to the left in tracing the winding to the right.

If instead of advancing 16 bars we had advanced 17, we would have connected from bar 1 to bar 18, then advancing 17 more bars from 18 would bring us to bar 35. There are, however, only 33 bars in the commutator so that what we have figured as bar 35 would be bar 2, which is one ahead of No. 1 bar from which we started, instead of one behind it. This means that the winding is progressive instead of retrogressive, for it continues to advance in the direction in which we are tracing.

Referring now to the diagram. We find we can change this from a retrogressive to a progressive winding and thereby change the direction of rotation if, in the left-hand sketch, we connect the coils from bar 28 to 12 and from 29 to 13. In a similar manner, the right hand sketch could be changed to a progressive winding by connecting from 30 to 14 and from 31 to 15.

SPARK PLUG GAP MAY NEED TO BE VARIED

Q—Regarding Fred McNary's trouble with an Oldsmobile 37A, wish to advise that in many cases we have found that with small bore engine the spark gap had to be about 1/32 in order to get the engine to idle properly.—Carlos F. Ellis, Rochester, Minn.

It seems to be true that in certain engines a variation in the spark plug gap will produce better operation. It may be that the gap will have to be less than customary or in some cases greater, the reasons not being perfectly evident. No doubt the decrease in compression obtained when idling has considerable to do with this condition, also the design of the secondary winding used on the ignition system. These points, however, do not give us much assistance in determining the exact setting and it is necessary to resort to experiment to see what gap will give best results.

BOOSTING ACCESSORY SALES

"MY accessory department pays me a dividend, because I have taken the time to build it up," says a Chicago car dealer who has, in his show room and service department, accessory show cases and stocks, "I have gone to the bottom of things and found out what the people who deal with me want. I know the number of so-called luxuries, they can afford and I carry these conveniences because at some time, they will buy them."

"Cars, like the ones I sell, that come with very little equipment from the factory, are always accessory prospects. As time goes along and the owner realizes the value of these little items, he purchases them. Tires, too, make a big sale item with me, because I have gone after that business strong. I have never found it necessary to cut prices on anything because I have sold quality, not material."

Arrow Grip Jack

The Arrow Grip Jack is the product of the Arrow Grip Mfg. Co., Glen Falls, N. Y. The model illustrated is one of several, all made with the same features of construction but adapted to different work. The one shown is known as the Model 302 and represents a new type in jack construction. It is particularly adapted to the needs of those operating heavy trucks or cars or for garage use. Four rollers in the base permit it to be placed in position or removed quickly. As it takes the weight, the rollers compress into the base giving a broad, sturdy foundation. The step on the lifting column cares for low front axles. Like all other Arrow Grips, it is full handle-controlled.

Swartz Grey Iron Light Weight Piston

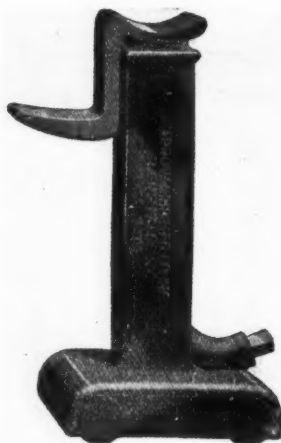
Swartz replacement pistons are machined according to original factory specifications for practically all car, truck and tractor motors. The radial rib construction of these pistons gives maximum strength and yet permits exceedingly light weight. It also promotes rapid radiation of heat away from the piston head. Swartz pistons have a solid, light weight skirt and maintain perfect roundness. Dense, close grained grey iron, mixed according to a special formula, is used. The Swartz Mfg. Co., Freeport, Ill., is the manufacturer.

Roosevelt Adjusta Wrench

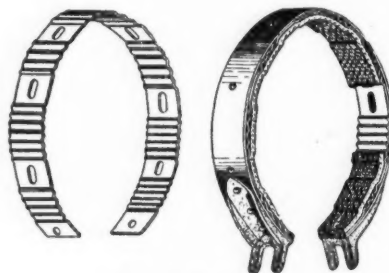
The feature of this wrench is its simplicity and the fact that it fits 25 sizes of hexagon nuts and eight sizes of square nuts. It cannot slip off the nuts or bolts and does not mar them, inasmuch as it



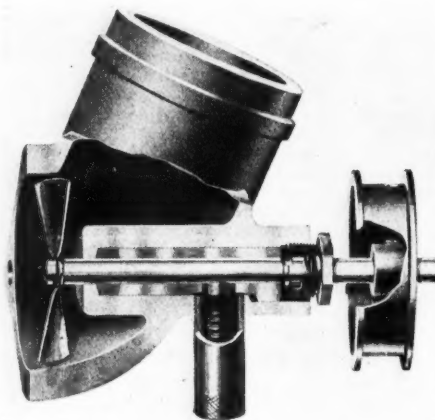
Roosevelt Adjusta wrench



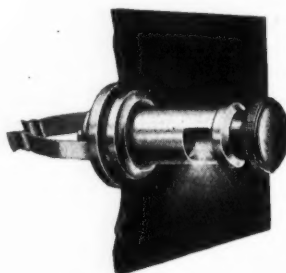
Arrow grip jack



Equal Cushions



Circulex pump for Fords



Bell dash lamp

grips the hexagon nuts on four surfaces and in this respect the wrench is much like a socket wrench. It requires only the movement of the thumb or forefinger to adjust it. It is eight inches in length and weighs 15 ounces. The bottom of the wrench presents a flat surface which makes the wrench desirable for places sometimes difficult to get at with more or less conventional forms of wrenches. The price of the wrench is \$1. Made by the Roosevelt Manufacturing Co., 53 West Jackson Blvd., Chicago.

Peerless Bar Type Radiator Cap

Another item in the line of Peerless products for Ford cars has recently been put on the market. It is the Peerless Bar Type Radiator Cap which fits all Chevrolet cars made during the past six years and also the Star cars. The cap is six and one-half inches long, and of a very sturdy and good looking design. It is priced at \$1 and is made by the Corcoran Mfg. Co., Cincinnati, O.

Circulex Pump for Fords

Circulex is the name of a new pump for Ford cars, announced by Price Bros., Frederick, Md. The object of the company in designing this pump was to make one that would be easily lubricated and every part made renewable.

The Bell Dash Lamp

The Bell Dash Lamp is of heavily nicked construction, dressed up with a knob of highly polished bakelite. When light is desired, the lamp is pulled out. When not in use, it is pushed in, leaving nothing visible on the dash but the knob and a nicked ring. The lighting feature is cared for by an automatic switch. It is made by the Bell Mfg. Co., 11 Elkins street, Boston, Mass.

Auto-Pas

The Auto-Pas is the product of the McKay Mfg. Co., San Francisco. It attaches to the left running board of the car and throws a green light ahead, a red light behind and a yellow light to the side to indicate safe clearance.

Equal Cushions

An automatic equalizer and band cushion for the Ford transmission has been announced by Hutchinson & Co., Dallas, Tex. They are designed to give longer life to the bands and to permit of easier operation of the car. A set of three, with transmission fork for assembling, costs 75 cents.



Peerless bar type radiator cap

GETTING MORE OUT of the SHOP

"I HAVE been able to sell used cars on the strength of my service department," a dealer explained to another dealer who wondered how he moved his old cars. "I have at all times told the truth about my used cars. If I reconditioned a car, I listed the things I did on a card where the prospective owner might see them. If I did not recondition a car, I was prompt in informing the interested party."

"When a car had not been reconditioned, I showed the prospect my facilities for doing it and I have sold many on the idea of having the car done over at an additional cost. They rather like this, because they feel that the work is being done to their order and will be done better. This is my opportunity, too, to sell them on my service department. I do the work right and have few comebacks."

Modified Constant Potential with the HB Vari-Rate Connector

This simple connector brought out by the Hobart Brothers Co., of Troy, O., will enable any constant potential user to claim the advantage of modified constant potential without the bother of buying a lot of varying resistance connectors.

The appliance consists of a special clamp fastened to the bus bars into which is built an accurate reading ammeter showing just the rate of charge going into the battery, and the special carbon pile resistance.

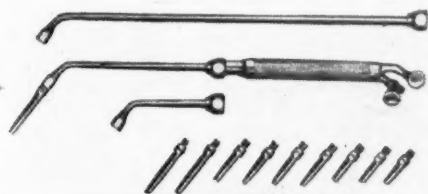
By turning the knob below the meter practically any rate of charge desired can be obtained, suited to the needs of the hospital battery, or new battery on the line.

The connector is complete with 18 inches of No. 4 rubber covered cable, special CP battery connection. It sells at \$10.50.

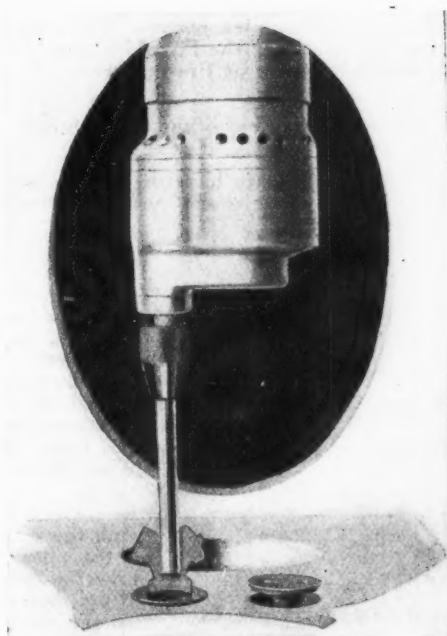
KMO Feeler Ribbon Sets

For fitting new pistons, testing bearing clearances and for a variety of other work, feeler ribbon is an indispensable part of every assembly room and repair shop. Generally, these feeler ribbons are made of shim stock which is apt to be inaccurate and very often the feeler ribbons are rather short, making it difficult to use them for certain kinds of work.

To meet the situation, the Kent-Moore Organization, General Motors Bldg., Detroit, has brought out a set of feeler ribbons in sets of assorted sizes. The KMO sets are made from specially tempered Swedish spring steel and are claimed to be accurate.



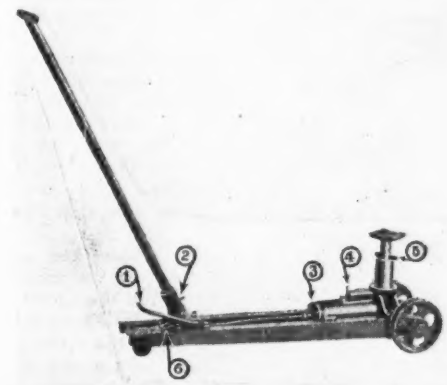
Gooseneck welding torches



Petersen valve lapper



Modified constant potential



Hird hydraulic jack

bons in sets of assorted sizes. The KMO sets are made from specially tempered Swedish spring steel and are claimed to be accurate.

They are made in two sets. The first set contains eight sizes as follows: .002, .003, .004, .005, .006, .008, .010, .015 in. The feeler ribbons are 1/2 in. wide and 8 in. long. This set sells for \$2.25 in a spring guard case, permitting one or more ribbons to be used at a time and the case acts as a handle. Another set containing five feeler ribbons of any of the above sizes is also provided. This sells for \$2.00 per set in the guard case.

Hird Hydraulic Jack

The features of the Hird Hydraulic Jack are the handle which works in any position from almost vertical to almost horizontal, so that it can be operated under overhanging stage and truck bodies and the fact that it is low and will go under certain types of cars and that it does not have to be pumped down but when released, eases the load down quickly and smoothly. It is sold by Wm. B. Rice & Co., 1551 University avenue, St. Paul, Minn.

Gooseneck Welding Torches

Gooseneck Welding Torches are made by the Bastian Blessing Co., 246 E. Ontario street, Chicago. The features of these torches are: A construction guaranteed against flashback, elimination of mixing in the handle, wide range of tips that are easily accessible, and nickel copper, heat-resisting tips. The torch, complete with three extensions and 10 tips sells at \$65.

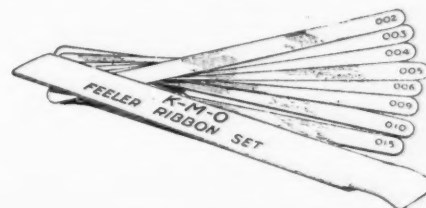
Petersen Valve Lapper

The Petersen Valve Lapper is the product of the A. H. Petersen Mfg. Co., Milwaukee, Wis. Complete equipment is supplied with each tool for speedy valve lapping. A special offset attachment makes any valve easy to get at. The price is \$39 for the 110-volt, \$42 for the 220 volt, special offset attachment, \$6, extra.

HOUSE CLEANING TIME

House cleaning time for automotive establishments is now—get the place in order for the spring rush which is already well under way and which will be greater this year than ever before.

Every car owner in your territory is a prospect for a spring overhaul job.



KMO feeler ribbon set

SQUEEKS & RATTLES

NOBODY kicking this week about people buying automobiles, because they ain't no automobiles to buy—all sold out. But of secondary importance is the organization last week of the First Honorary Division of the International Order of Scofflaws and our appointment as the Chief and Exalted Procurer of Pre-Prohibition Primers, which honor, we, of course, declined.

We are opposed to drinking, in all its forms, excepting the "out of the glass" form.

To prove that our mind is ever in search of the beautiful, we have decided to have a "Poetry Page" every once in a while—this being the first. It will give us the opportunity we have long sought—that of showing up Kipling. And you—won't you have a nip and throw us a line or two for our next "Poetry Page"?

Life

A little sun, a little rain,
A little loss, a little gain,
A little joy, a little strife—
And this is life.
Some kind deed done each passing day,
A few good-byes, a setting sun—
And life is done.

—Mid-West Review.

Uncle Joe Has a Word

I'm thankful that the sun and moon
Are both hung up so high,
That no pretentious hand can reach
And pull them from the sky.
If they were not, I have no doubt,
But some reforming ass
Would recommend to take them down
And light the world with gas.

—Uncle Joe Cannon.

Motor Row Anthology

Many men said that I was
Foolish to tell other
Dealers how and why
My trade expanded.
Business, they said, was a
Secret, that each dealer
Should learn only by experience.
I hated waste. I loved the cars.
I wanted to see people
Happy and the dealers real men
Among other business men.
So I told all of them how
I made money and left a
Trail of content.
I could not tell to them
How I myself differed
From them, so only a few
Profited.
I was not silly. The retrospect
Is pleasant, and as I view from afar
I would do it again.

—C. J.

My Friend, Ike

He wasn't rich as dollars go,
He didn't have a pile of dough
He didn't own a motor car,
He couldn't often travel far,
He couldn't dress in costly style;
He just possessed a kindly smile.

He had a happy sort of way,
Knew how to work and how to play,
And he respected women fair
And dealt with men upon the square
And people thought him well worth while
Because he had a kindly smile.

—The Kablegram.

"A man who is growling all the time must lead a dog's Life."

—Tim-Ken.

Miles of Smiles

A smile, and a mile—and over the hills
And afar, and afar away!
And the motor purrs and the good car whirs—
And the woods and the fields are gay.
For life is strife in the marts of trade,
But the country affords delight;
And a hundred miles mean a hundred smiles—
When you ride in the Willys-Knight!

A mile, and a smile—and we're off, we're off!
And the cool morn's fragrant kiss,
And the wind from the south, brings a taste to the mouth
Like the tang of our childhood bliss;
And the motor sings—and the good car springs
To the work, in its merry might;
And a hundred miles mean a hundred smiles—
When you ride in the Willys-Knight!

A smile, and a mile—and a burst of speed
To the shrill of the bobwhite's fife!
For the day is new and the sun and dew
Are as spice to the wine of life;
And the motor sings, and the good car swings
As the chauffeur guides aright;
And a hundred miles mean a hundred smiles—
When you ride in the Willys-Knight!

—Dr. James Ball Naylor.

Our Apologies, Doctor, Please— "But It Isn't a Willys-Knight!"

A wang and a bang—and out of the barn,
But it's hard to get away
For the motor stops and starts and stops,
And the alley is soft as hay.
Yes, life is good on a boulevard wide,
But here in the mushy snow,
A hundred tries, means a hundred dies,
And it's cold, damn' cold, you know.

A chug and a knock—and we're over the rock,
That somehow stood in our way,
And the wind from the west, means a cold in the chest,
And another day without pay.
And the motor snorts—it's full of shorts,
As we try with all our might,
To start the thing and make it sing,
But it isn't a Willys-Knight!

And after an hour, we get away,
And start for our job in town,
The steering post's loose, the battery needs juice,
And the snow comes crowding down.
But we stick to the wheel, though at times we feel,
That we'd like to end it all,
We'd give a pint of gin had we traded it in,
For that new sedan last fall.

A howl and a growl—and a stopping short,
At the sign of the copper's right,
And we know that we in the days to be,
Will own a Willys-Knight.
For the motor's dead, but now darts ahead,
As a tire gives up the fight,
And a dozen blocks, means a million knocks,
But it isn't a Willys-Knight!

LEW BRICATION.

Current Motor Truck Specifications

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	ENGINE					REAR AXLE		TIRES			MAKE AND MODEL	Tons Capacity	ENGINE					REAR AXLE		TIRES		
		Price	Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear	Price			Make & Model	Bore & Stroke	Clutch Make	Gearset Make	Make & Model	Final Drive	Front	Rear		
Acme.....20	1-1/2		Co-N.....3 1/2x5	B&B	Cot.....	Ti-6250.	WO.	34x5n	34x5n			Diamond T.....EL 5		Hi-200.....4 1/2x5 1/2	Cov.....	Cov.....	Ti-6760.	WO.	36x6	40x6d			
Acme.....30	1-1/2		Co-J4.....3 3/4x5	B&B	Cot.....	Ti-6352.	WO.	34x3 1/2	34x5			Diamond T.....S 5		Hi-B2.....4 1/2x6	B-L.....	B-L.....	Ti-6760.	WO.	36x6	40x6d			
Acme.....40	1-1/2		Co-J4.....3 3/4x5	B&B	Cot.....	Ti-6460.	WO.	34x3 1/2	34x5			Dodge Brothers.....K 2	\$ 730	Own.....3 3/4x5 1/2	Own.....	Own.....	Own.....	SB.....	32x4n	32x4n			
Acme.....60	2-3/4		Co-K4.....4 1/2x5 1/2	B&B	Cot.....	Ti-6560.	WO.	36x4	36x7			Dorris.....K 2	2490	Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-5512.	IG.....	33x5n	33x5n			
Acme.....90	3-4		Co-L4.....4 1/2x5 1/2	B&B	Cot.....	Ti-6660.	WO.	36x5	40x10			Dorris.....K 4 1/2	3400	Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6560.	WO.	36x4	36x7			
Acme.....125	5-6 1/4		Co-B5.....4 1/2x6	B&B	Cot.....	Ti-6760.	WO.	36x6	40x12			Dorris.....K 7 1/2	4400	Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6660.	WO.	36x7	36x10			
Amer. La France.....2 1/2		\$3950	Own.....4 1/2x6	Own.....	Own.....	Own.....	DR.	36x4	36x7			Dort.....109 1/2	685b	Ly-K.....3 1/2x5	Del.....	Own.....	FL-105.....	SB.....	31x4n	31x4n			
Amer. La France.....3 1/2		4950	Own.....4 1/2x6	Own.....	Own.....	Own.....	WO.	36x5	36x5			Duplex.....G 1		Bu-WTU.....3 3/4x5 1/2	B-L.....	B-L.....	Ti-5511.	SB.....	33x5	33x5n			
Amer. La France.....5		5500	Own.....4 1/2x6	Own.....	Own.....	Own.....	WO.	36x6	40x6			Duplex.....GH 1 1/2		Bu-WTU.....3 3/4x5 1/2	Cov.....	Cov.....	Sh-1501.....	WO.	35x5	36x6			
Armleder.....21	1 1/2		Bu-GTU.....4 1/2x5 1/2	Ful.....	Ful.....	Ti-6460.	WO.	34x3 1/2	34x6k			Duplex.....A 2		Hi-400.....4 1/2x4	Cov.....	Cov.....	Sh-103.....	WO.	35x5n	38x7n			
Armleder.....HWC 2 1/2			Bu-HTU.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6560.	WO.	36x4k	36x4dk			Duplex.....AC 2 1/2-3		Hi-400.....4 1/2x4	B-L.....	B-L.....	Vu-4.....	WO.	34x5	36x8			
Armleder.....HWC 3 1/2			Co-C4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6660.	WO.	36x5k	36x5dk			Duplex.....E 3 1/2		Bu.....4 1/2x5 1/2	B-L.....	B-L.....	Own.....	IG.....	36x8	36x8			
Armleder.....HWC 4 1/2			Bu-YTU.....4 1/2x6	B-L.....	B-L.....	Ti-6660.	WO.	36x5k	36x5dk			F. W. D.....B 3	4200	Wi-A.....4 1/2x5 1/2	H-S.....	Cot.....	Own.....	SP.....	36x6	36x6			
Armleder.....HWC 5 1/2			Co-E4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6660.	WO.	36x5k	36x5dk			Fageol.....1 1/2	3000	Wa-YA.....3 3/4x5 1/2	B-L.....	Own.....	Ti-6461.....	WO.	34x3 1/2	34x6			
Atterbury.....20R 1 1/2-2		2475	Co-J4.....3 3/4x5	Ful.....	Ful.....	Ti-6160.	WO.	34x4k	34xdk			Fageol.....2 1/2	3900	Wa-CU.....4 1/2x5 1/2	B-L.....	Own.....	Ti-6560.....	WO.	34x4k	36x7			
Atterbury.....22C 2 1/2		3375b	Co-K4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6560.	WO.	36x4k	40x6d			Fageol.....1	5000	Wa-DU.....4 1/2x6 1/2	B-L.....	Own.....	Ti-6660.....	WO.	36x5	36x5d			
Atterbury.....22D 3 1/4		4275b	Co-L4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6660.	WO.	36x5	40x7d			Fageol.....1	5700	Wa-DU.....4 1/2x6 1/2	B-L.....	Own.....	Ti-6760.....	WO.	36x6	40x6d			
Atterbury.....8E 5-6		4975b	Co-B2.....4 1/2x6	B-L.....	B-L.....	Ti-6760.	WO.	36x6	40x7d			Federal.....R 2 1/2		Co-J4.....3 3/4x5	B&B	Det.....	Ti-6250.....	WO.	33x5n	33x5n			
Autocar.....21 1/2-2		2200	Own.....4 1/2x4 1/2	Own.....	Own.....	Own.....	DR.	34x4	34x6			Federal.....S-23 1 1/2		Co-J4.....3 3/4x5	B&B	Det.....	Ti-6400.....	WO.	36x3 1/2	36x5			
Autocar.....27 1/2		3450	Own.....4 1/2x5 1/2	Own.....	Own.....	Own.....	DR.	34x5	36x8			Federal.....U 2 1/2-3 1/4		Co-K4.....4 1/2x5 1/2	B&B	Det.....	Ti-6560.....	WO.	36x4	36x8			
Autocar.....26 1/2		4650	Own.....4 1/2x5 1/2	Own.....	Own.....	Own.....	DR.	34x5	36x12			Federal.....W 2 1/2-3 1/4		Co-L4.....4 1/2x5 1/2	B&B	War.....	Ti-6660.....	WO.	36x5	40x5d			
Available.....H 1 1/2		2450	He-O.....4x5	B-L.....	B-L.....	Ti-6460.	WO.	36x3 1/2	36x5			Federal.....X 2 1/2-5-6		Co-B5.....4 1/2x6	B&B	War.....	Ti-6700.....	WO.	36x6	40x6d			
Available.....H 2 1/2		3160	He-O.....4x5	B-L.....	B-L.....	Ti-6560.	WO.	36x4	36x8			Ford.....TT 1	370	Own.....3 3/4x4	Own.....	Own.....	Own.....	WO.	30x3 1/2	32x4 1/2			
Available.....H 3 1/2		4175	He-MU3.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6660.	WO.	36x5	40x5d			G.M.C.....K 16 1		Own.....3 1/2x5 1/2	Own.....	Own.....	Own.....	SB.....	34x5n	34x5n			
Available.....H 5		5375	He-T3.....5x6	B-L.....	B-L.....	Ti-6760.	WO.	36x6	40x12			G.M.C.....K 16 1		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6560.....	WO.	36x4	36x7			
Bessemer.....G 1		1450	Co-N.....3 1/2x5	Ful.....	Ful.....	To-A.....IG.	35x5n	35x5n			G.M.C.....K 17 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6660.....	WO.	36x5	40x5d				
Bessemer.....H 2 1/2		1995	Co-N.....3 1/2x5	B&B	Bak.....	LM-7150	DR.	36x3 1/2	36x5			G.M.C.....K 17 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6660.....	WO.	36x5	40x12			
Bessemer.....J 2 1/2		2895	Co-C2.....4 1/2x5 1/2	B&B	B-L.....	LM-7250	DR.	36x4	36x4d			G.M.C.....K 18 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6760.....	WO.	36x5	40x6d			
Bessemer.....K 2 1/2		3495	Co-B7.....4 1/2x5 1/2	B&B	B-L.....	To-E.....IG.	36x5	36x10			G.M.C.....K 18 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6760.....	WO.	36x5	40x6d				
Bethlehem.....KN 1		1595	Own.....3 1/2x5	B&B	Det.....	Ea-1000	SB.....	35x5n	35x5n			G.M.C.....K 19 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6760.....	WO.	36x5	40x6d			
Bethlehem.....GN 2		2495	Own.....4 1/2x5 1/2	B&B	Det.....	Wi-90A	DR.	34x4	34x6			G.M.C.....K 19 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6760.....	WO.	36x5	40x6d			
Bethlehem.....HN 3		3295	Own.....4 1/2x5 1/2	Ful.....	Ful.....	Wi-88E	DR.	36x4	36x8			G.M.C.....K 19 1/2		Own.....4 1/2x5 1/2	Own.....	Own.....	Ti-6760.....	WO.	36x5	40x6d			
Brockway.....E 1			Wi-SU.....4 1/2x5	B-L.....	B-L.....	Co-52001	SB.....	33x5n	33x5n			Garford.....15 1	1590	Bu-MU.....3 3/4x5 1/2	B&B	Own.....	Ti-6250.....	WO.	34x5n	34x5n			
Brockway.....S 1 1/2			Wi-SU.....4 1/2x5	B-L.....	B-L.....	Ti-6460.	WO.	36x4	36x6			Garford.....25B 1 1/2	2375	Bu-WU.....3 3/4x5 1/2	Own.....	Own.....	Ti-6460.....	WO.	36x3 1/2	36x5			
Brockway.....K 2 1/2			Co-K4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6560.	WO.	36x4	36x8			Garford.....70H 2 1/2	3250	Bu-HTU.....4 1/2x5 1/2	Own.....	Own.....	Ti-6560.....	WO.	36x4	36x8			
Brockway.....R 3 1/2			Co-L4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6660.	WO.	36x5	36x5d			Garford.....80 1	4200	Bu-YTU.....4 1/2x6	Own.....	Own.....	Ti-6660.....	WO.	36x5	36x5d			
Brockway.....T 5			Co-B5.....4 1/2x6	B-L.....	B-L.....	Ti-6760.	WO.	36x6	40x7d			Garford.....68D 5	5000	Bu-BTU.....5x6 1/2	Own.....	Own.....	Ti-6760.....	WO.	36x6	40x6d			
Buick.....23-4-SD 3/4		945	Own.....3 3/4x4 1/2	Own.....	Own.....	Own.....	SB.....	31x4n	31x4n			Garford.....150A 7 1/2	5750	Bu-BTU.....5x6 1/2	Own.....	Own.....	Own.....	Ch.....	36x6	40x7d			
Case.....TR 2			Own.....4 1/2x5 1/2	TD.....	Own.....	To-C139	IG.....	36x6n	38x7n			Gary.....F 1	1775	Bu-WU.....3 3/4x5 1/2	Ful.....	Ful.....	Ti-6352.....	WO.	36x3 1/2	36x5			
Chevrolet.....Sup 1 1/2		395	Own.....3 1/2x4	Own.....	Own.....	Own.....	SB.....	30x3 1/2	30x3 1/2			Gary.....F 1	2450	Bu-GTU.....4 1/2x5 1/2	Ful.....	Ful.....	Ti-6460.....	WO.	36x4	36x7			
Chevrolet.....Unit 1 1/2		550	Own.....3 1/2x4	Own.....	Own.....	Own.....	SB.....	31x4n	34x4 1/2			Gary.....F 1	2850	Bu-HTU.....4 1/2x5 1/2	Ful.....	Ful.....	Ti-6560.....	WO.	36x4	36x8			
Clinton.....20 1-1/4		1980	Bu-WTU.....3 3/4x5 1/2	B-L.....	B-L.....	Ti-6250.	WO.	34x5n	34x5n			Gary.....F 1	3790	Bu-YTU.....4 1/2x6	B-L.....	B-L.....	Ti-6560.....	WO.	36x6n	40x8n			
Clinton.....45 1 1/2		2840	Bu-GTU.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6460.	WO.	34x4	34x3 1/2			Gary.....F 1	4450	Bu-BTU.....5x6 1/2	B-L.....	B-L.....	Ti-6760.....	WO.	36x6	40x12			
Clinton.....65 2 1/2		3480	Bu-ETU.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6560.	WO.	34x5	34x5d			Graham Bros.....1 1/2	1265	Do.....3 1/2x4 1/2	Dod.....	Dod.....	Own.....	SB.....	33x4 1/2	34x5n			
Clinton.....90 3 1/4		4160	Bu-YTU.....4 1/2x6	B-L.....	B-L.....	Ti-6660.	WO.	36x6	36x6d			Graham Bros.....1 1/2	1325	Do.....3 1/2x4 1/2	Dod.....	Dod.....	Own.....	SB.....	33x4 1/2	36x6n			
Clinton.....120 5-7		4890	Bu-BTU.....5 1/2x6 1/2	B-L.....	B-L.....	Ti-6760.	WO.	36x6	36x7d			Graham Bros.....1 1/2	1245	Ly.....3 1/2x5	B&B	B-L.....	Sa-1483	SB.....	33x5n	33x5n			
Clydesdale.....10A 1 1/4		1785	Co-N.....3 1/2x5	B&B	B-L.....	Ti-6250.	SB.....	34x5n	34x5n			Graham Bros.....1 1/2	1750	Co-N.....3 1/2x5	Ful.....	Ful.....	CL-1D.....	IG.....	36x3 1/2	36x5d			
Clydesdale.....8 1/2		2650	Co-K4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6460.	WO.	36x4	36x7			Graham Bros.....1 1/2	2250	Co-J4.....3 3/4x5	Ful.....	Own.....	Oa-603.....	WO.	36x4k	36x8k			
Clydesdale.....6 3/4		3300	Co-L4.....4 1/2x5 1/2	B-L.....	B-L.....	Ti-6560.	WO.	36x5	36x5d			Graham Bros.....1 1/2	2475	Co-K4.....4 1/2x5 1/2	Ful.....	Own.....	Sh-103.....	WO.	36x4k	36x8k			
Clydesdale.....4 1/2		4200	Co-B5.....4 1/2x6	B-L.....	B-L.....	Ti-66																	

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Kissel.....	4	\$3625	Own.....	4 1/2 x 5 1/2	War.....	War.....	Sh-31.....	WO.....	36x5	36x12
Larrabee.....	X2	1785	Co-8R.....	3 3/4 x 4 1/2	B-L.....	B-L.....	Sa-1480 SB.....	34x5n	34x5n	34x5n
Larrabee.....	J4	2400	Co-J4.....	3 3/4 x 5	B-L.....	B-L.....	Sh-1501 WO.....	34x3 1/2	34x5k	34x5k
Larrabee.....	K5	3550	Co-L4.....	4 1/2 x 5 1/2	B-L.....	B-L.....	Sh-22.....	WO.....	36x4	36x8
Larrabee.....	L4	4100	Co-L4.....	4 1/2 x 5 1/2	B-L.....	B-L.....	Sh-31.....	WO.....	36x5	36x10
Maccar.....	EX	11 1/2	Wi-SU.....	4x5	B-L.....	B-L.....	Sa-1526e SB.....	34x5n	34x5n	34x5n
Maccar.....	L-11	11 1/2	Wi-TAU.....	4x6	B-L.....	B-L.....	Ti-6460 WO.....	36x4	36x6	36x6
Maccar.....	HT2	11 1/2	Wi-TAU.....	4x6	B-L.....	B-L.....	Ti-6560 WO.....	36x4	36x4d	36x4d
Maccar.....	H-13	11 1/2	Wi-VAU.....	4x6	B-L.....	B-L.....	Ti-6560 WO.....	36x4	36x5d	36x5d
Maccar.....	M-24	11 1/2	Wi-VAU.....	4x6	B-L.....	B-L.....	Ti-6666 WO.....	36x5	36x6d	36x6d
Maccar.....	G-15	11 1/2	Wi-RBU.....	5x6	B-L.....	B-L.....	Ti-6760 WO.....	36x6	40x6d	40x6d
MacDonald.....	O-3-5	5500b	Bu-WTU.....	3 3/4 x 5 1/2	B-L.....	B-L.....	*Own.....	IG.....	36x6	36x10
MacDonald.....	A-7	8000b	Bu-YTU.....	4x6	B-L.....	B-L.....	*Own.....	IG.....	40x7	40x11
Mack.....	AB1	3000	Own.....	4x5	Own.....	Own.....	Own.....	Ch.....	36x4	36x3 1/2
Mack.....	AB2	3150	Own.....	4x5	Own.....	Own.....	Own.....	DR.....	36x4	36x3 1/2
Mack.....	AB2	3300	Own.....	4x5	Own.....	Own.....	Own.....	CH.....	36x4	36x4d
Mack.....	AB2	3750	Own.....	4x5	Own.....	Own.....	Own.....	DR.....	36x4	36x4d
Mack.....	AB2	3400	Own.....	4x5	Own.....	Own.....	Own.....	CH.....	36x4	36x4d
Mack.....	AC3	3850	Own.....	4x5	Own.....	Own.....	Own.....	DR.....	36x4	36x4d
Mack.....	AC3	4950	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x5	40x5d
Mack.....	AC5	5500	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x6	40x6d
Mack.....	AC6	5750	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x6	40x12
Mack.....	AC7	6000	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x7	40x7d
Mack.....	AB7	3400	Own.....	4 1/2 x 5	Own.....	Own.....	Own.....	CH.....	36x4	36x4d
Mack.....	AC7	4950	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x5	40x5d
Mack.....	AC10	5500	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x6	40x6d
Mack.....	AC13	5750	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x6	40x12
Mack.....	AC15	6000	Own.....	5x6	Own.....	Own.....	Own.....	CH.....	36x7	40x7d
Mason.....	11 1/2	1295	He.....	4x5	Hoo.....	War.....	FL.....	SB.....	34x5n	34x5n
Master.....	11 1/2	11 1/2	Bu-WTU.....	3 3/4 x 5 1/2	Ful.....	Ful.....	Ti-5511 SB.....	33x5n	33x5n	33x5n
Master.....	21 1/2	11 1/2	Bu-OU.....	4 1/2 x 5 1/2	Ful.....	Ful.....	Ti-6460 WO.....	34x4	34x6	34x6
Master.....	41 1/2	11 1/2	Bu-ETU.....	4 1/2 x 5 1/2	Ful.....	Ful.....	Ti-6560 WO.....	34x4	36x8	36x8
Master.....	51 1/2	11 1/2	Bu-YTU.....	4x6	B-L.....	B-L.....	Ti-6666 WO.....	36x5	40x10	40x10
Master.....	61 1/2	11 1/2	Bu-YTU.....	4x6	B-L.....	B-L.....	Ti-6760 WO.....	36x5	40x12	40x12
Master.....	64 1/2	11 1/2	Bu-ATU.....	4 1/2 x 6 1/2	B-L.....	B-L.....	Ti-6760 WO.....	36x6	40x14	40x14
Maxwell.....	1 1/2	1097	Own.....	3 3/4 x 4 1/2	Own.....	Own.....	Own.....	TI.....	36x5n	36x5n
Menominee.....	B1	1650	Wi-SU.....	4x5	B&B.....	Det.....	Co-5200 SB.....	35x5n	35x5n	35x5n
Menominee.....	HT1	2000	Wi-CAU.....	3 3/4 x 5	Ful.....	Del.....	Wi-800G WO.....	34x3 1/2	36x5k	36x5k
Menominee.....	H1	2475	Wi-EAU.....	4x5	Ful.....	Del.....	Wi-800H WO.....	36x3 1/2	36x5k	36x5k
Menominee.....	D2-2 1/2	2875	Wi-TAU.....	4x6	Ful.....	Del.....	Wi-800J WO.....	36x4	36x8	36x8
Menominee.....	J5	4850	Wi-RAU.....	4x6	B&B.....	Det.....	Ti-6760 WO.....	36x6	40x12	40x12
Moline.....	10 1/2	1695	Own.....	3 3/4 x 5	B&B.....	Own.....	To-A.....	IG.....	34x5n	36x6n
Nash.....	2018-1	1595	Own.....	3 3/4 x 5 1/2	B&B.....	Det.....	CI-1D.....	IG.....	34x4	34x5
Nash.....	4017F-2	2750	Bu-HU.....	4 1/2 x 5 1/2	B&B.....	Own.....	Own.....	IG.....	36x6	36x6
Nash.....	3018-2	2150	Own.....	3 3/4 x 5 1/2	B&B.....	Det.....	CI-2D.....	IG.....	34x4	34x7
Nash.....	5018-2	2250	Own.....	3 3/4 x 5 1/2	B&B.....	Det.....	CI-2D.....	IG.....	34x4	34x7
Noble.....	A-75-1	1395	Bu-WTU.....	3 3/4 x 5 1/2	Ful.....	Ful.....	CI-300 SB.....	34x4 1/2	34x4 1/2	34x4 1/2
Noble.....	A-21-1	1890	Bu-WTU.....	3 3/4 x 5 1/2	Ful.....	Ful.....	Sh-1501 WO.....	34x5	34x5	34x5
Noble.....	B-31-2	2695	Bu-CTU.....	4x6	Ful.....	Ful.....	Sh-103 WO.....	36x4	36x7	36x7
Noble.....	D-51-2	3150	Bu-ETU.....	4 1/2 x 5 1/2	Ful.....	Ful.....	Sh-21 WO.....	36x4	36x8	36x8
Noble.....	E-71-5	3850	Bu-YTU.....	4x6	Ful.....	War.....	Sh-30 WO.....	36x5	36x10	36x10
Old Reliable.....	B1	3500	Wi-CAU.....	4x6	Ful.....	Ful.....	Sh-21 WO.....	34x4	36x8	36x8
Old Reliable.....	C1	4250	Wi-VAU.....	4x6	Ful.....	Ful.....	Sh-31 WO.....	36x5	36x12	36x12
Old Reliable.....	D5	5000	Wi-RAU.....	4x6	Own.....	B-L.....	Sh-51 WO.....	36x6	40x12	40x12
Old Reliable.....	K1 1/2	6000	Wa-P.....	4 1/2 x 6 1/2	Own.....	Own.....	Ch.....	36x6	40x14	40x14
Oldsmobile.....	T1	1095	Own.....	3 3/4 x 5 1/2	B&B.....	War.....	To-0X21 IG.....	35x5n	35x5n	35x5n
Oneida.....	B1 1/2	2825	Hi-400.....	4x5 1/2	Ful.....	Ful.....	Wi-800J WO.....	36x3 1/2	36x7	36x7
Oneida.....	C1 1/2	3200	Hi-400.....	4x5 1/2	Ful.....	Ful.....	Wi-900C WO.....	36x4	36x7	36x7
Oneida.....	D1 1/2	4050	Hi-200.....	4 1/2 x 5 1/2	Ful.....	Ful.....	Ti-6652 WO.....	36x5	36x10	36x10
Overland.....	91ce	395	Own.....	3 3/4 x 4	B&B.....	Own.....	Own.....	SB.....	36x3 1/2	36x3 1/2
Patriot, Revere.....	1	1350	Co-N.....	3 3/4 x 5	B&B.....	Cov.....	Ti-6250 WO.....	35x5n	35x5n	35x5n
Patriot, Lincoln.....	2	2400	Hi-400.....	4x5 1/2	Cov.....	Ful.....	Ti-6560 WO.....	34x4k	34x4k	34x4k
Pat., Washington.....	3	3000	Hi-200.....	4 1/2 x 5 1/2	Cov.....	Cov.....	Wi-900 WO.....	36x5k	36x8k	36x8k
Pierce-Arrow, XA2	3300	Own.....	4x5 1/2	Own.....	Own.....	Own.....	Own.....	WO.....	36x4	36x5d
Pierce-Arrow, XB3	3500	Own.....	4x5 1/2	Own.....	Own.....	Own.....	Own.....	WO.....	36x5	36x5d
Pierce-Arrow, WC1	4600	Own.....	4 1/2 x 6 1/2	Own.....	Own.....	Own.....	Own.....	WO.....	36x5	36x6d
Pierce-Arrow, WD5	4700	Own.....	4 1/2 x 6 1/2	Own.....	Own.....	Own.....	Own.....	WO.....	36x6	36x7
Pierce-Arrow, RE3	5100	Own.....	4 1/2 x 6 1/2	Own.....	Own.....	Own.....	Own.....	WO.....	36x6	40x7d
Pierce-Arrow, RF7 1/2	5200	Own.....	4 1/2 x 6 1/2	Own.....	Own.....	Own.....	Own.....	WO.....	36x6	40x8d
Rainier.....	R31	3600	Co-N.....	3 3/4 x 5	B-L.....	B-L.....	Ti-6250 WO.....	35x5n	35x5n	35x5n
Rainier.....	R29-1	3600	Co-N.....	3 3/4 x 5	B-L.....	B-L.....	Ti-6250 WO.....	34x3 1/2	34x4	34x4
Rainier.....	R36	3600	Co-J4.....	3 3/4 x 5	B-L.....	B-L.....	Ti-6460 WO.....	34x3 1/2	34x5	34x5
Rainier.....	R28-2 1/2	3600	Co-K4.....	4 1/2 x 5 1/2	B-L.....	B-L.....	Sh-103 WO.....	36x4	36x7	36x7
Rainier.....	R20-2 1/2	3600	Co-K4.....	4 1/2 x 5 1/2	B-L.....	B-L.....	Ti-6560 WO.....	36x4	36x8	36x8
Rainier.....	R25-2 1/2	3600	Co-L4.....	4 1/2 x 5 1/2	B-L.....	B-L.....	Ti-6666 WO.....	36x5	36x5d	36x5d
Rainier.....	R27-6	3600	Co-B5.....	4 1/2 x 6	B-L.....	B-L.....	Ti-6760 WO.....	36x6	40x6d	40x6d
Reo.....	F1 1/2	1185	Own.....	4 1/2 x 5 1/2	Own.....	Own.....	SB.....	34x4 1/2	34x4 1/2	34x4 1/2
Reo.....	F1 1/2	1485b	Own.....	4 1/2 x 5 1/2	Own.....	Own.....	SB.....	33x4 1/2	33x4 1/2	33x4 1/2
Republic.....	75 1/2	1185b	Ly-CT.....	3 3/4 x 5	Ful.....	Ful.....	To-750 IG.....	33x5n	33x5n	33x5n
Republic.....	11X2	1185b	Co-J1.....	3 3/4 x 5	Ful.....	Ful.....	To-CT2 IG.....	34x1	34x6	34x6
Republic.....	19W3	1185b	Wa-FU.....	4x5 1/2	Ful.....	Ful.....	To-CT2 IG.....	36x4	36x8	36x8
Republic.....	193	1185b	Co-K4.....	4 1/2 x 5 1/2	Ful.....	Ful.....	To-CT2 IG.....	36x4	36x8	36x8
Republic.....	20 1/2	1185b	Co-L4.....	4 1/2 x 5 1/2	Ful.....	Ful.....	To-E.....	IG.....	36x5	36x10
Rowe.....	CW 1 1/2	3000	Wi-CAU.....	3 3/4 x 5	B-L.....	B-L.....	Sh-1501 WO.....	36x6n	36x6n	36x6n
Rowe.....	CDW 2 1/2	3300	Wi-EAU.....	4x5	B-L.....	B-L.....	Sh-103 WO.....	34x5	36x3 1/2	36x3 1/2
Rowe.....	CDW 2 1/2	3300	Wi-NU.....	4x5	B-L.....	B-L.....	Sh-21 WO.....	34x5	36x4d	36x4d
Rowe.....	GSW 3 1/2	4150	Wi-TAU.....	4x6	B-L.....	B-L.....	Sh-31 WO.....	36x7	36x5d	36x5d
Rowe.....	HW 1 1/2	4500	Wi-VAU.....	4x6	B-L.....	B-L.....	Sh-51 WO.....	36x7	40x6d	40x6d
Rowe.....	FW 5 1/2	4850	Wi-VAU.....	4x6	B-L.....	B-L.....	Sh-51 WO.....	36x7	40x6d	40x6d
Ruggles.....	15 3/4	895	HS.....	3 1/2 x 5	M&E.....	Ful.....	Co.....	SB.....	32x4 1/2	32x4 1/2
Ruggles.....	20R 1 1/2	1375	Own.....	4x5	B-L.....	B-L.....	Co-5200 SB.....	31x5n	34x5n	34x5n
Ruggles.....	40 1/2	2095	Own.....	4x5	B-L.....	B-L.....	Wi-65 DR.....	34x5n	34x7	34x7
Ruggles.....	40H 2 1/2	2295	Own.....	4x5	B-L.....	B-L.....	Wi-88E DR.....	36x4	36x8	36x8
Sandow.....	CG&G1	1795	Co-N.....	3 3/4 x 5	Ful.....	Ful.....	Sh-1501 WO.....			

Current Motor Truck Specifications—Continued

(This list comprises trucks distributed on a national basis)

CANADIAN

MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES		MAKE AND MODEL	Tons Capacity	Price	ENGINE		Clutch Make	Gearset Make	REAR AXLE		TIRES	
			Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear				Make & Model	Bore & Stroke			Make & Model	Final Drive	Front	Rear
Gotfredson...20	3 1/2	\$2275	Bu-WTU	3 3/4 x 5 1/2	B-L	B-L	Ti-6250	WO.	34x5n	34x5n	National...FA	1	\$2450	Wa-BUX	3 3/4 x 5 1/2	B-L	B-L	Ti-6352	WO.	35x5n	35x5n
Gotfredson...40	7	3290	Bu-GTU	4 1/2 x 6 1/2	B-L	B-L	Ti-6460	WO.	36x6n	38x7n	National...GA	1 1/2	2750	Wa-BUX	3 3/4 x 5 1/2	B-L	B-L	Ti-6460	WO.	34x4k	34x6k
Gotfredson...50	10 1/2	3775	Bu-ETU	4 1/2 x 6 1/2	B-L	B-L	Ti-6560	WO.	36x4	36x8	National...HD	2	3750	Wa-CU	4 1/2 x 6 1/2	B-L	B-L	Ti-6560	WO.	36x5	36x10
Gotfredson...80	17 1/2	4775	Bu-YTU	5 1/2 x 7 1/2	B-L	B-L	Ti-6660	WO.	34x5	36x12	National...NB	3	4750	Wa-DU	4 1/2 x 6 1/2	B-L	B-L	Ti-6660	WO.	36x6	36x12
Gotfredson...100	22 1/2	5800	Bu-BTU	5 1/2 x 7 1/2	B-L	B-L	Ti-6760	WO.	36x6	40x14	National...OA	6	6150	Wa-EU	5 1/2 x 7 1/2	B-L	B-L	Ti-6760	WO.	36x6	40x14
Mapleleaf...AA	1 1/2	3000	Hi-300	3 3/4 x 4 1/2	Ful.	Ful.	Sh-1501	WO.	34x5n	36x6n	Veteran...M	1 1/2	2899	Bu-CTU	3 3/4 x 4 1/2	B&B	Cot.	Sh-1501	WO.	34x5n	34x5n
Mapleleaf...BB	2 1/2	3600	Hi-400	4 1/2 x 5 1/2	Ful.	Ful.	Sh-109	WO.	36x4	36x7	Veteran...P	2 1/2	3699	Bu-HTU	4 1/2 x 5 1/2	B&B	Cot.	Sh-109	WO.	36x4	36x7
Mapleleaf...CC	3 1/2	4050	Hi-500	4 1/2 x 5 1/2	Ful.	Ful.	Sh-21	WO.	36x4	36x1d	Veteran...R	3 1/2	4200	Bu-HTU	4 1/2 x 5 1/2	B&B	Cot.	Sh-21	WO.	36x4	36x7
Mapleleaf...DD	4 1/2	4800	Hi-600	4 1/2 x 5 1/2	Ful.	Ful.	Sh-31	WO.	36x5	36x5d	Veteran...S	4 1/2	5395	Bu-YTU	4 1/2 x 6	B&B	Cot.	Sh-31	WO.	36x5	36x10
Mapleleaf...DD	5 1/2	5625	Hi-1600	4 1/2 x 5 1/2	Ful.	Ful.	Sh-51	WO.	36x6	36x6d											

Current Tractor Specifications

MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)	MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)	MAKE & MODEL	Drawbar-Pulley Rating	Recommended No. of 14 Ins. Plovs	Price	ENGINE			Weight (Lbs.)	Traction Members, Dimensions, Diameter & Face (Ins.)
				Make	No. of Cyls Bore & Stroke	Weight (Lbs.)							Make	No. of Cyls Bore & Stroke	Weight (Lbs.)							Make	No. of Cyls Bore & Stroke	Weight (Lbs.)		
Allis-Chalmers...	6-12	1	\$325	LeR.	4-3 1/2 x 4 1/2	2500	48x 6		Gray...	EU	22-40	4	2385	Wau.	4-5 x 6 1/2	6900	†	Rumely OilPull...	E	30-60	8-10	...	Own.	2-10x12	26000	80x30
Allis-Chalmers...	15-25	3	1285	Mid.	4-1 1/2 x 5 1/2	4700	46x12							Own.	2-5 1/2 x 6 1/2	4250	46x10	Russell...	15-30	3-4	...	Chl.	4-5 x 6 1/2	6000	56x14	
Allis-Chalmers...	20-35	4	1835	Own.	4-1 1/2 x 6 1/2	6150	50x12		Hart-Parr...	20	-20	2	...	Own.	2-6 1/2 x 7	5220	52x10	Russell...	20-40	4-5	...	Chl.	4-5 1/2 x 7	7900	60x16	
Allwork...D	30-38	4-5	1695	Own.	4-5 x 7	6500	48x14		Hart-Parr...	30	-30	3	...	Own.	2-6 1/2 x 7	7560	52x18	Russell...	30-60	8-10	...	Own.	4-8 x 10	22550	84x22	
Allwork...	C	14-28	3	1495	Own.	4-1 1/2 x 6	4800	48x12	Hart-Parr...	(Road)	-30	3	...	Own.	4-6 1/2 x 6 1/2	7510	32x18	Shaw-Enechs (Gr.)			...	LeR.	4-3 1/2 x 4 1/2	4400	48x 8	
Allwork...	C	16-30	3	1295	Own.	4-5 x 6	7200	48x12	Heider...	40	-40	4	...	Wau.	4-4 1/2 x 5 1/2	4000	5 1/2 x 8	Topp-Stewart...	B	30-45	4	...	Wau.	4-4 1/2 x 6 1/2	7800	42x12
Aultman-Taylor...	15-30	3-4	1900	Chl.	4-5 x 6 1/2	5800	70x12		Heider...	D	9-16	2	...	Wau.	4-4 1/2 x 6 1/2	6000	57x10	Toro...	6-10	2	\$675	LeR.	4-3 1/2 x 4 1/2	2900	41x 9	
Aultman-Taylor...	22-45	4-6	3100	Own.	4-5 1/2 x 8	12500	70x20		Heider...	C	12-20	3	...	LeR.	4-3 1/2 x 4 1/2	2800	46x 6	Townsend...	10-20	2-3	800	Own.	2-6 1/2 x 7	4500	48x12	
Aultman-Taylor...	30-60	8-10	1400	Own.	4-7 x 9	22500	90x24		Huber...	(Light 4)	12-25	3	985	Wau.	4-4 1/2 x 5 1/2	5000	60x10	Townsend...	15-30	3-4	1350	Own.	2-7 x 8	6500	56x18	
Avery...	15	3-4	...	Own.	4-1 1/2 x 6	4750	50x12		Huber...	(Super 4)	15-30	3	...	Mid.	4-4 1/2 x 6	6000	60x10	Townsend...	25-50	4-8	2250	Own.	2-8 1/2 x 10	11500	60x24	
Avery...	20-35	4-5	...	Own.	4-1 1/2 x 7	7500	60x16		Lauson...	S	12-25	3	...	Mid.	4-4 1/2 x 5 1/2	4200	...	Traylor...	6-12	1	500	LeR.	4-3 1/2 x 4 1/2	1750	38x10	
Avery...	25-50	5-6	...	Own.	4-1 1/2 x 8	22000	87 1/2 x 24		Lauson...	T	15-30	4	...	Bea.	4-4 1/2 x 6	6200	...	Twin City...	12-20	3	1200	Own.	4-4 1/2 x 6	4700	50x12	
Avery...	45-65	8-10	...	Own.	4-1 1/2 x 8	22000	87 1/2 x 24		Leader...	B	12-18	2	375	Own.	2-6 1/2 x 6	4800	50x12	Twin City...	20-35	5	2750	Own.	4-5 1/2 x 6 1/2	8400	60x20	
Avery, Tr. Runner		3	...	Own.	4-4 x 5 1/2	5000	x 8		Leader...	N	16-32	3-4	1275	Chl.	4-5 x 6	5800	52x12	Twin City...	40-65	8	4750	Own.	4-7 1/2 x 9	23700	84x24	
Avery, Road Racer		3	...	Own.	6-3 x 11	4600	42x 6		Lincoln...	A	15-30	3	1600	Bud.	4-4 1/2 x 6	5000	40x14	Uncle Sam...C-20	12-20	2-3	...	Her.	4-4 x 5	3000	46x12	
Bates (St. Mule) H	15-25	3	...	Mid.	4-1 1/2 x 5 1/2	3600	48x10		Little Giant...	B	16-22	4	...	Own.	4-4 1/2 x 5	5200	54x14	Uncle Sam...B-19	20-30	3-4	...	Bea.	4-4 1/2 x 6	4650	50x12	
Bates (St. Mule) F	18-25	3	...	Mid.	4-1 1/2 x 5 1/2	4850	56x10		Little Giant...	A	26-35	6	...	Own.	4-5 1/2 x 6	8700	66x20	Uncle Sam...D-21	20-30	3-4	...	Bea.	4-4 1/2 x 6	4600	50x12	
Bates (St. Mule) G	25-35	4	...	Mid.	4-1 1/2 x 6	6500	58x16		Lombard...	100	12-16		...	Own.	6-5 1/2 x 7	19000	x12	Wallis...	OK	15-27	3	...	Own.	4-4 1/2 x 5 1/2	3600	48x12
Bates (St. Mule) 40	30-40	4	...	Mid.	4-1 1/2 x 6	8500	64x12		London...	12-25	3	...	...	Mid.	4-4 1/2 x 5 1/2	48x12	Waterloo Boy...N	12-25	3	...	Own.	2-6 1/2 x 7	5869	52x12	
Best...	B	25-35	4	1250	Ste.	4-1 1/2 x 6 1/2	6000	64x12	McCork-Deering...	10-20	2	850	Own.	4-4 1/2 x 5	3700	42x12	Wisconsin...	16-30	3-1	1750	Chl.	4-5 x 6 1/2	5600	52x12		
Best...	30-40	4	...	Own.	4-1 1/2 x 6 1/2	8100	68x11 1/2		McCork-Deering...	15-30	3	1250	Own.	4-4 1/2 x 6	5750	50x12	Yuba (Ball Tread)...	15-25	4	2550	Chl.	4-5 1/2 x 7	7500	52x12		
Best...	60-80	9	...	Own.	4-6 1/2 x 8 1/2	18500	89x20		Minneapolis...	12-25	3	...	Own.	4-4 1/2 x 7	6800	56x12	Yuba (Ball Tread)...	25-40	8	4500	Own.	4-5 1/2 x 7	10130	*48x17 1/2		
Best...	80-100	15	...	Own.	4-6 1/2 x 8 1/2	5500	52x12		Minneapolis...	17-30	3-4	...	Own.	4-4 1/2 x 7	6400	54x12										
Bryan...	Steam	15-30	3	2385	Own.	2-4 x 5	5500	52x12	Minneapolis...	22-44	4-5	...	Own.	4-6 x 7	12410	62x20										
Case...	12-20	3	895	Own.	4-4 1/2 x 5	4230	42x12		Minneapolis...	32-70	8-10	...	Own.	4-7 1/2 x 9	22500	85x30										
Case...	15-27	3-4	1350	Own.	4-1 1/2 x 6	6600	52x14		Moline (Un.)...	D	9-18	2-3	725	Own.	4-3 1/2 x 5	3380	52x 8	Aro...	F	3-6	1	\$385	Own.	1-4 1/2 x 5	1000	30x 4
Case...	22-40	4-5	2650	Own.	4-5 1/2 x 6 1/2	10700	56x16		Moline (Or.)...	D	9-18	2-3	725	Own.	4-3 1/2 x 5	3340	44x 8	Beeman...	Jr.	1 1/2-1	...	195	B&S.	1-2 1/2 x 2 1/2	210	30x 3
Case...	40-72	8-10	1900	Own.	4-7 x 8 1/2	21200	72x20		Monarch...	C	20-30	4	3530	Bea.	4-4 1/2 x 6	8700	66x12	Beeman...	K	1 1/2-1	...	265	Own.	1-3 1/4 x 4 1/2	550	25x 3 1/2
Caterpillar...2 Ton	15	3	...	Own.	4-4 1/2 x 5 1/2	4000			Monarch...	E	25-40		5003	Bea.	4-4 1/2 x 6	12000	67x12	Bolens...			...	180	B&S.	1-2 1/2 x 2 1/2	200	16 x 3
Caterpillar...5 Ton	25	4	...	Own.	4-4 1/2 x 6	9400			Monarch...	D	35-60		6003	Bea.	6-8 x 10	15000	89x12	Centaur...	1923	2 1/2-5	1	345	N-W.	1-4 1/2 x 4 1/2	800	28x 4
Caterpillar...10 Ton	40	6	...	Own.	4-6 1/2 x 7	20000			Nichols-Shepard...	20-42	4-6	2600	Own.	2-8 x 10	13500	64x20	Do-It-All...	(Jack)	2 1/2-6	1	395	Own.	1-3 1/2 x 3 1/2	750	...	
Cletrac...	F	9-16	2	815	Own.	4-3 1/2 x 4 1/2	1930	*42x 5 1/2	Nichols-Shepard...	25-50	6-8	3320	Own.	2-9 x 12	20500	69x23	Do-It-All (Baby)...	2 1/2-6	1	495	Own.	1-4 1/2 x 5	1200	26x 2 1/2		
Cletrac...	W	12-20	3	1345	Own.	4-4 x 5 1/2	3455	*48x 8	Nichols-Shepard...	35-70	8-12	4030	Own.	2-10x14	30000	73x32	Do-It-All (Twin)...	12	4-15	1	495	Own.	2-3 1/2 x 3 1/2	800	32x 4	
Eagle...	F	12-22	3	...	Own.	2-7 x 8	5850	48x12	Pioneer...	G	18-36	4	...	Own.	4-5 1/2 x 6	6500	60x18	Kinkade...	1923	1 1/2-3	1	190	Own.	1-3 x 3 1/2	180	22x 5 1/2
Eagle...	H	16-30	4	...	Own.	2-8 x 8	7100	48x12	Pioneer...	C	40-75	10	...	Own.	4-7 x 8	21000	96x24	M.B.M. Red...	E	1-4 1/2	...	250	Own.	1-3 1/2 x 4	410	20x 3
E-B...	AA	12-20	3	...	Own.	4-4 1/2 x 5	4550	51x12	Rumely OilPull...	K	12-20	3	...	Own.	2-6 x 8	6638	51x12	Motor Maculaturer...			...	148	Own.	1-2 1/2 x 3 1/2	210	16 1/2 x 3
E-B...	Q	12-20	3	...	Own.	4-4 1/2 x 5	6500	60x12	Rumely OilPull...	H	16-30	4	...	Own.	2-7 x 8 1/2	9506	56x16	N.B...	2	6	1	375	Own.	2-2 1/2 x 4	750	32x 4
E-B...	Q	16-32	4	...	Own.	4-5 1/2 x 7	9400	72x16	Rumely OilPull...	G	20-40	6	...	Own.	2-8 x 10	12968	64x20	Utilitor...	501	2 1/2-4	1	295	Own.	1-3 1/4 x 4 1/2	740	24 1/2 x 3
Fageol...	19-12	2	1200	Lyc.	4-3 1/2 x 5	3600	48x 8 1/2		Rumely OilPull...	G	20-40	6	...	Own.	2-8 x 10	12968	64x20	Utilitor...	501A	2 1/2-4	1	340	Own.	1-3 1/4 x 4 1/2	925	24 1/2 x 3
Fordson...	A	-18	420	Own.	4-4 x 5	2562	42x12																			
Frick...	A	12-20	1000	Erd.	4-4 x 6	5800	60x10																			
Frick...	C	15-28	1600	Bea.	4-4 1/2 x 6	6730	60x12																			

B&S—Briggs & Stratton

Bea—Beaver

Bud—Buda

CH—Climax

Her—Hercules

LeR—LeRoi

Lyc—Lycoming

Mid—Midwest

N-W—New Way

Ste—Stearns

Wau—Waukesha

Wei—Weideley

Wis—Wisconsin

†—Unless otherwise specified all traction members are of the wheel type.

*—Track Type, length of ground contact surface

†—Drum Type

B&S—Briggs & Stratton
Bea—Bever
Bud—BudaChl—Climax
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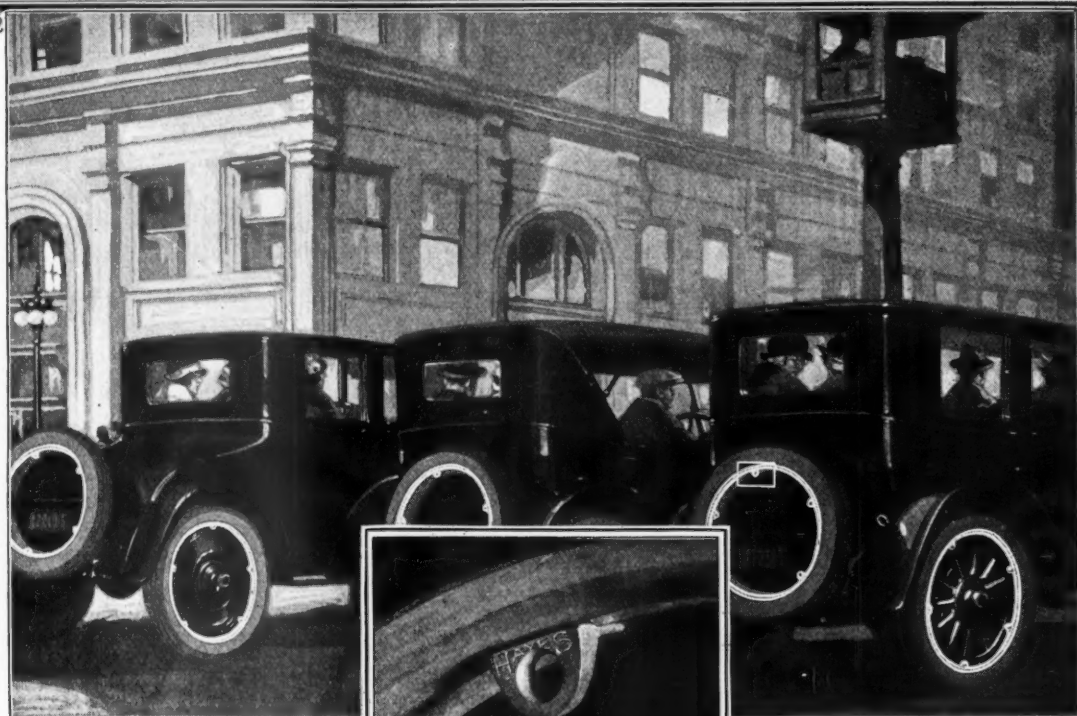
Current Taxicab Specifications

NAME AND MODEL	Price	Wheel Base (Ins.)	Tire Size (Ins.)	Weight (Lbs.)	ENGINE				ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Univer- sal Make	REAR AXLE	
					Make and Model	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A. A.C.)	Carbu- reter Make	Generator and Starter Make	Ignition Make				Type and Make	Gear Ratio
Checker.....	\$2340	117	32x4½	4100	Buda—WTU...	4-3½x5½	22.50	Zenith...	Westing.	Bosch...	m-d Fuller...	Fuller...	Blood...	¾ F-Columbia..	4.87
Dodge.....		116	32x4		Own.....	4-37½x4½	24.03	Stewart.	North E.	North E.	m-d Own.	Own.	m-Own.	¾ F-Own.	4.54
Driggs.....	1950	108½	30x3½	2200	Own.....	1-2½x4½	11.03	Zenith.	Bosch...	Bosch...	m-d Fuller.	Fuller.	Spicer.	¾ F-Own.	4.75
Elar.....	2100	118	33x4½	3415	Lycoming—CF.	1-3½x5½	21.03	Carter.	Delco.	Delco...	s-p Borg & B.	Muncie.	Peters.	¾ F-Salisbury.	4.75
Elar.....	2450	118	33x4½	3590	Cont—8R	4-3½x4½	27.34	Strom.	Delco.	Delco...	s-p Borg & B.	Warner.	Spicer.	¾ F-Salisbury.	4.75
Kelsey.....	E 1900	112	32x4	3500	Lycoming CH.	4-3½x5	19.60	Zenith.	Bosch.	Bosch.	s-p B & B.	W-M.	n-Spicer.	¾ F-Sals.	5.10
Pennant.....	2895*	115	33x4½	3800	Buda—WTU	4-3½x5½	22.50	Zenith.	Westing.	Bosch.	m-d Fuller.	Fuller.	Blood.	¾ F-Columbia.	4.87
Premier.....	4A 2910	118	33x4½	3850	Buda—WTU	4-3½x5½	22.50	Zenith.	Bosch.	Bosch.	m-d Fuller.	Fuller.	Blood.	¾ F-Columbia.	4.70
Rauch & Lang.	T 2350	112	32x4	3200	Buda—WTU	4-3½x5½	22.50	Zenith.	Dyneto.	Bosch.	s-p Detroit	Detroit.	Spicer.	¾ F-Standard.	5.10
*Rauch & Lang.		102	33x4½	4100	Own.....	Electric.		None.	None.	None.	None.	None.	Own.	¾ F-Own.	8.6
Reo.....	V 2085	113	33x4½	3465	Own.....	6-3½x5	24.30	Rayfield.	North.E.	North.E.	m-d Own.	Own.	Own.	¾ F-Own.	4.70
White.....	15A 1910	119	34x4½		Own.....	4-3½x5½	22.50	Zenith.		North E.	s-p Own.	Own.		¾ F Own.	
Willys-Knight.	A 2250	118	32x4½	3300	Own-Knight.	4-2½x4½	21.03	Tillot.	Auto-Lite.	m-d Own.	Own.	Own.	Own.	¾ F Own.	5.12
Yellow.....	.03 2310	100	33x4½	3830	Cont—V4	1-3½x5	22.50	Zenith.	†North.E.	Bosch.	m-d Brown-L.	Brown-L.	Spicer.	¾ F-Timken.	4.90
Yellow.....	A2 1975	100	29x4½	3335	Cont—V7	4-3½x5	18.23	Zenith.	†North.E.	Bosch.	m-d Brown-L.	Brown-L.	Spicer.	¾ F-Timken.	4.90

Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES							Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE			ELECTRICAL SYSTEM			Clutch Type and Make	Gearset Make	Universal Type and Make	REAR AXLE		BRAKES, Service and Emergency
OPEN MODELS			CLOSED MODELS			Make and Model				No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.A.C.)	Carburetor Make	Generator and Starter Make	Ignition Make	Type and Make				Type and Make	Gear Ratio	
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.															
\$1950	\$1695	\$1760	\$1850d	d2195f	\$2350	\$2550d	127	33x4 1/2	American.....D-66	H-S.....91	6-3 1/2x5	29.40	Strom.	G-D.....	A-K.....	s-p B&B.	War.....	m Hart.	F Salis	5.10	R-R
	1195		1445c	1125	1495	d1895p	115	32x4*	Anderson.....41	Cont...7 U	6-3 1/2x4 1/2	23.44	Zenith.	West.....	West.....	s-p B&B.	Durston.	f Good.	1/2 F Salis	5.75	R-T
		1595			1695		122	32x4*	Anderson.....50	Cont...8 R	6-3 3/4x4 1/2	27.34	Zenith.	Remy.....	Remy.....	s-p B&B.	Durston.	f Good.	3/4 F Salis	1.50	R-T
	1395		1660d		1995		120	32x4*	Apperson.....6	Falls T8000	6-3 1/2x4 1/2	23.44	Strom.	Remy.....	Remy.....	s-p Rock.	Mech.....	m Thie.	1/2 F Col.	5.10	R-R
	2485	2485	1365d	1695d	3385	3385	130	33x5	Apperson.....8-23-S	Own.....	8-3 1/2x5	33.80	Johnson	Bijur.....	Remy.....	m-d Own.	Own.....	m Thie.	1/2 F Own	4.25	R-R
	1095	d1295p	1365d	1695d	1595	1845d	114	31x4*	Auburn.....6-43	Cont...7 U	6-3 1/2x4 1/2	23.44	Strom.	Remy.....	Remy.....	s-p B&B.	Warner	m Univ.	1/2 F Col.	4.63	R-T
	1695		1935d		2245f	2445	122	32x4 1/2	Auburn.....6-63	Own.....	6-3 1/2x5	25.35	Strom.	Remy.....	Remy.....	s-p B&B.	Warner	m Thie.	1/2 F Col.	4.63	R-T
							124														
	1395		1495d	1685d	1850		118	32x4	Barley.....6-50	H-S.....40	6-3 1/4x5	25.35	Strom.	Delco.....	Delco.....	s-p B&B.	Fuller.....	f M&E.	3/4 F Col.	5.10	F-R
	935	965	800g	1395c	1495		109	31x4	Buick.....1924	Own.....	4-3 3/4x4 1/2	18.23	Marvel.	Delco.....	Delco.....	m-d Own.	Own.....	m Own.	3/4 F Own	4.66	F-T
	1275	1295	1135g	1995c	1695		120	32x4	Buick.....1924	Own.....	6-3 3/4x4 1/2	27.34	Marvel.	Delco.....	Delco.....	m-d Own.	Own.....	m Own.	F Own	1.10	F-T
	1385g		1565	1675a	1945c	2235f	128	32x4 1/2	Buick.....1924	Own.....	6-3 3/4x4 1/2	27.34	Marvel.	Delco.....	Delco.....	m-d Own.	Own.....	m Own.	F Own	4.70	F-R
	3085	3085	3085	3875	3950	3585	132	33x5	Cadillac.....V 63	Own.....	8-3 1/2x5 1/2	31.25	Own.....	Delco.....	Delco.....	m-d Own.	Own.....	m Spicer	F Tim	4.50	F-R
	1750	1790	2230d	2480c	2575		122	32x4 1/2	Case.....X	Cont...8 R	6-3 3/4x4 1/2	27.34	Schebler.	Delco.....	Delco.....	m-d Own.	Own.....	f Sneed.	1/2 F Col.	4.90	R-R
							132	33x5	Case.....Y	Cont...6 T	6-3 3/4x5 1/2	31.54	Italyfield.	Delco.....	Delco.....	m-d Own.	Own.....	f Sneed.	3/4 F Col.	4.70	R-R
							117	32x4	Chalmers.....V	Own.....	6-3 1/2x4 1/2	25.35	Strom.	A-L.....	A-L.....	s-p Mech.	Warner.	m Mech.	1/2 F Tim	5.13	R-R
							123	32x4 1/2	Chalmers.....V	Own.....	6-3 1/2x4 1/2	25.35	Strom.	A-L.....	A-L.....	s-p Mech.	Warner.	m Mech.	1/2 F Tim	5.13	R-R
	1595	1485	1635	1785c	1895d	1745	123	32x4*	Chandler.....Six	Own.....	6-3 1/2x5	29.40	Strom.	Bosch.....	Bosch.....	s-p B&B.	Own.....	Own.....	F Own	4.45	R-T
	490	495	395g	610	795	725c	103	30x3 1/2	Chevrolet...Superior	Own.....	4-3 1/2x4	21.76	Zenith.	Remy.....	Remy.....	c Own.	Own.....	m Own.	1/2 F Own	3.77	R-T
	1525	1335	1395d	d1795f	1625	1895d	112 1/2	29x4 1/2	Chrysler.....Six	Own.....	6-3 x4 1/2	21.60	Ball&B	Remy.....	Remy.....	m-d Own.	Own.....	m Dett.	1/2 F Own	4.60	F-T
	1085	1015		1145d	1215	1295	112 1/2	31x4*	Cleveland.....42	Own.....	6-3 1/4x4 1/2	22.50	Strom.	Bosch.....	Bosch.....	s-p B&B.	Own.....	m Mech.	1/2 F Own	4.90	R-T
	2175	2175	2175	2475	2750c	3075	127 1/2	33x5*	Cole.....Master	Nort...311	8-3 1/2x4 1/2	39.20	Johnson	Delco.....	Delco.....	m-d Nort.	Nort.....	m Spicer	F Col.	4.70	R-R
							115	32x4*	Columbia...Big Six	Cont...8 R	6-3 3/4x4 1/2	27.34	Strom.	A-L.....	A-L.....	s-p B&B.	Durston	m Spicer	1/2 F Tim	4.75	R-R
	995	995	1195d	1395	1495	1650d	116	31x4*	Columbia...Light Six	Cont...7 U	6-3 1/2x4 1/2	23.44	Strom.	A-L.....	A-L.....	s-p B&B.	Durston	m Spicer	1/2 F Tim	4.80	R-T
	1395p	1295	1595c	1495	2195p	1895f	116	32x4	Courier.....	Falls. 8000	6-3 1/2x4 1/2	23.44	Strom.	West.....	A-K.....	s-p B&B.	Muncie.	f Flex.	3/4 F Col.	5.10	R-R
		3100	3100	3500c	4500		138	33x4 1/2	Crawford.....23-6-70	Cont...6 T	6-3 3/4x5 1/2	31.54	Zenith.	West.....	Bosch.....	m-d B-L.	B-L.....	m Spicer	1/2 F Tim		R-R
		5900	6300	7650			132	33x5	Crawford-Dagmar. 6-70	Cont...6 T	6-3 3/4x5 1/2	31.54	Zenith.	West.....	Bosch.....	m-d B-L.	B-L.....	m Spicer	1/2 F Tim		R-R
							142		Cunningham...V4	Own.....	8-3 1/2x5	45.00	Strom.	Delco.....	Delco.....	m-d Own.	Own.....	f Sneed.	F Tim	4.23	R-R
	1295	1495	1495c	1595	1795c		115	31x4*	Davis.....71	Cont...7 U	6-3 1/2x4 1/2	23.44	Strom.	A-L.....	A-L.....	s-p B&B.	Warner.	m Peters	1/2 F Tim	5.16	R-R
	865	895	1060d	1035	1250	1545d	116	32x4*	Davis.....81	Cont...8 R	6-3 3/4x4 1/2	27.34	Strom.	A-L.....	A-L.....	s-p B&B.	Warner.	m Peters	1/2 F Tim	5.16	R-R
					1385	1535c			Dodge Brothers.	Own.....	4-3 3/4x4	24.03	Stewart.	N.E.....	N.E.....	m-d Own.	Own.....	m Own.	1/2 F Tim	4.54	R-T
		3950	3950	4150c	4985c	5550	136	32x6	Dorris.....6-80	Own.....	6-4 x5	38.40	Strom.	West.....	Bosch.....	m-d Own.	B-L.....	m Spicer	1/2 F Tim	3.77	R-R
		1095	1245c	1535d	1595	d1535f	115	31x4*	Dort.....27	Falls T8000	6-3 1/2x4 1/2	23.41	Carter	Bosch.....	Bosch.....	m-d Det.	Own.....	m Ther.	1/2 F Fln.	4.66	R-R
	6500	6250	6750	6500c	d7800f	7500	134	33x5	Duesenberg. Straight 8	Own.....	8-2 1/2x5	26.45	Strom.	Delco.....	Delco.....	m-d Own.	Own.....	f Cl.	1/2 F Col.	4.90	F-T
	1990	1990		2850	2850		124	32x4 1/2	Dupont.....C	H-S.....90	6-3 1/2x5	29.40	Strom.	West.....	West.....	m-d B-L.	B-L.....	m Spicer	F Col.		R-R
	890	890	1065d	1365	1165	1445	109	31x4	Durant.....A-22	Cont. Spec	4-3 1/2x4 1/2	24.03	Tillotson	A-L.....	A-L.....	s-p Own.	Warner.	m Spicer	1/2 F Ad.	4.33	R-T
							115	30x3 1/2	Eagle.....6	Cont. Spec	6-3 1/2x4 1/2	23.44	Tillotson	A-L.....	A-L.....	s-p B&B.	Warner.	m Spicer	1/2 F Ad.	4.77	F-R
		995	1195d	1265f	p1625d		112	31x1*	Elcar.....4-40	Cont...CF	4-3 3/4x5	21.03	Zenith.	Delco.....	Delco.....	s-p B&B.	Warner.	m Mech.	1/2 F Salis	1.70	R-R
		1220		1650	1490f		113	31x4	Elcar.....6-50	Cont...7U	6-3 1/2x4 1/2	23.44	Strom.	A-L.....	A-L.....	s-p B&B.	Warner.	m Mech.	1/2 F Salis	4.70	R-T
		1395	1595d	1995d	p2195d		118	32x4*	Elcar.....6-60	Cont...8 R	6-3 3/4x4 1/2	27.34	Strom.	Delco.....	Delco.....	s-p B&B.	Warner.	m Hart.	1/2 F Salis	1.70	R-R
		1895	2145	2345	d3000f		118	32x4 1/2	Elgin.....25	Falls T8000	6-3 1/2x4 1/2	23.44	Strom.	DeJon.....	DeJon.....	s-p B&B.	Warner.	f Sneed.	1/2 F Col.	4.66	F-T
		850		975			110 1/2	31x3 1/2	Essex.....6	Own.....	6-2 3/4x4	16.54	Stewart.	Bosch.....	Bosch.....	m-d Own.	Own.....	m Spicer	1/2 F Own	5.40	R-R
	1295	1295	1295	1895c	2085		120	32x4*	Flint.....	Cont. Spec	6-3 3/4x5	27.34	Strom.	DeJon.....	DeJon.....	s-p Own.	Warner.	m Spicer	1/2 F Ad.		R-R
	265r	295s	230g	525	685	590d	100	30x3 1/2	Ford.....T	Own.....	4-3 1/2x4	22.50	Own.....	Own.....	Own.....	m-d Own.	Own.....	m Own.	1/2 F Own	5.63	T-R
							115	32x4 1/2	Franklin.....10-B	Own.....	6-3 1/2x4	25.35	Own.....	A.K.....	A-K.....	s-p M&E.	Own.....	m Spicer	F Own	4.73	T-R
	895	895	995d	1095	1145	1445	112	32x4	Gardner.....Series 5	Lyc. Spec	4-3 1/2x5	21.76	Zenith.	West.....	West.....	s-p B&B.	Mech.....	m Peters	1/2 F Fln.	4.80	R-T
		520					100	30x3 1/2	Gray.....	Own.....	4-3 1/2x4	21.03	Scow.....	West.....	West.....	s-p Own.	Detr.....	m Mech.	1/2 F Tim	3.90	R-T
	630		720d	750	895		104	30x3 1/2	Gray.....	Own.....	4-3 3/4x4	21.03	Scow.....	West.....	West.....	s-p Own.	Detr.....	f Mech.	1/2 F Tim	3.90	R-T
	2250	2250					120	32x4 1/2	H.C.S.....Series 4	Weid.....	4-3 3/4x5 1/2	22.50	Strom.	Delco.....	Delco.....	m-d B-L.	B-L.....	m Spicer	1/2 F Own	1.63	R-R
	2650				3350		126	32x4 1/2	H.C.S.....Series 6	Own.....	6-3 1/2x5	29.40	Strom.	Delco.....	Delco.....	m-d B-L.	B-L.....	m Spicer	1/2 F Own	1.36	R-R
	1395	1395	1495c		2195		121	32x4	Hanson.....66	Cont...8 R	6-3 3/4x4 1/2	27.34	Marvel.	Delco.....	Delco.....	s-p B&B.	G-L.....	m Univ.	F Tim	4.66	R-R
		1775		2175c	2350		121	32x4	Hatfield.....6-55	H-S.....40	6-3 1/2x5	25.35	Strom.	Bosch.....	Bosch.....	s-p B&B.	Durston	m Spicer	1/2 F Col.	4.63	R-R
		1295	1695d	d1795f	1845	2205d	121	32x4 1/2	Haynes.....60	Own.....	6-3 1/2x4 1/2	29.40	Italyfield.	L-N.....	Kingst.	m-d Own.	Mech.....	m Thie.	1/2 F Own	4.41	R-T
		1395	1750d	1895	2205d	2495d															
		1350	1425	1475d	1895		126	34x4 1/2	Hudson.....Super 6	Own.....	6-3 1/2x5	29.40	Stewart.	Bosch.....	Bosch.....	m-d Own.	Own.....	m Spicer	1/2 F Own	4.45	R-R
	1175	1175																			



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Hayes wheels are saving time, energy, and money for millions of motorists. Now made for balloon tire equipment

Practically One Car In Every Two Has Hayes Wheels

Along boulevard or by-road—wherever duty dictates or crowds congregate—there go millions of motor cars. There, too, go Hayes wheels *standard equipment on approximately 50% of all motor cars in America.*

The moment you look at the spare rim of a car—see the lugs fastened to it—you know that car has the most approved type of wheel—the Hayes.

To women or men to whom moments are precious, that once disturbing thought, the inevitable tire change, has ceased to have the same significance. With Hayes wheels, changing tires is accomplished in half the usual

time. There are no loose lugs to lose. Held securely in perfect alignment the rim stays right and tight. It cannot come out of line, and cannot cause uneven and wasteful wear on tires and bearings.

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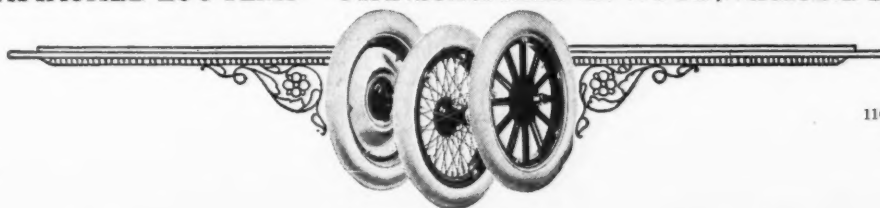
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WITH ATTACHED LUG RIMS ~ STANDARDIZED IN WOOD, WIRE AND DISC



Current Passenger Car Specifications

(This list comprises cars distributed on a national basis)

PRICES						Wheel Base (Ins.)	Tire Size (Ins.)	NAME AND MODEL	ENGINE			ELECTRICAL SYSTEM		Clutch: Type and Make	Gearset Make	Universal: Type and Make	REAR AXLE		BRAKES, Service and Emergency
OPEN MODELS			CLOSED MODELS						Make and Model	No. of Cyls. Bore and Stroke	Horse Power Rating (N.A.C.)	Carburetor Make	Generator and Starter Make				Ignition Make	Type and Make		Gear Ratio
2-3 Pass.	4-5 Pass.	6-7 Pass.	Sport Models	2-3 Pass.	4-5 Pass.	6-7 Pass.													
5000	5000	5000	4200g	6300	6500	132	33x5*	LaFayette.	Own.	8-3 1/2 x 5 1/2	33.80	Johnson	Delco.	Delco.	m-d Own.	Own.	m Own.	F Std	4.58 R-R ²
1895	1895	1895	2145d	2395j	2225s	119	32x4*	Lexington.	Ansted-M.	6-3 1/2 x 4 1/2	26.30	Rayfield.	G-D.	Conn.	s-p Long.	Warner.	f Snead.	3/2 F Salis	5.10 R-R ²
1895	1895	1895	2145d	2395j	2225s	123	32x4*	Lexington.	Ansted-M.	6-3 1/2 x 4 1/2	26.30	Rayfield.	G-D.	Conn.	s-p Long.	Warner.	f Snead.	3/2 F Salis	5.10 R-R ²
3800	3800	3800	4600e	4400	4900	117	32x4	Liberty.	Own.	6-3 1/2 x 5	23.44	Strom.	Wagner	Wagner	s-p B&B.	Detroit.	m Spicer	1 1/2 F Tim	4.80 R-R ²
3800	3800	3800	4600e	4400	4900	136	33x5*	Lincoln.	Own.	8-3 1/2 x 5	36.45	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer	1 1/2 F Tim	4.85 R-R ²
8900	7900	7900	5200	4700	5100s	142	35x5	Locomobile Series 8.	Own.	6-4 1/2 x 5 1/2	48.60	Ball&B.	West.	Delco.	m-d Own.	Own.	m Own.	F Own	3.50 R-R ²
2390g	2785	2785	2985a	3585	4285s	136	32x4 1/2	Marmon.	Own.	6-3 1/2 x 5 1/2	33.75	Strom.	Delco.	Delco.	m-d Own.	Own.	m Spicer	3/4 F Own	4.10 R-R ²
2390g	2785	2785	2985e	3985	3985	109	31x4	Maxwell.	Own.	4-3 1/2 x 4 1/2	21.03	Stewart	Remy.	Remy.	s-p Mech.	Own.	f Own.	1/2 F Own	4.60 R-R ²
795	795	795	895b	935	1195	109	31x4	Maxwell.	Own.	4-3 1/2 x 4 1/2	21.03	Stewart	Remy.	Remy.	s-p Mech.	Own.	f Own.	1/2 F Own	4.60 R-R ²
2500	2500	2500	3000	3000	3000	127	32x4 1/2	McFarlan.	Wise.	6-3 1/2 x 5	27.34	Rayfield.	Delco.	Delco.	m-d Long.	Warner.	.....	1 1/2 F Univ	5.10 R-R ²
5400	5000	5700	2985e	3985	3985	140	33x5	McFarlan.	Wise.	6-4 1/2 x 6	48.60	Rayfield.	West.	West.	m-d M&F.	B-L.	m Peter.	1 1/2 F Tim	3.75 R-R ²
1295	1295	1295	1495d	1685e	1695	115	31x4*	Moon.	Cont..7 U	6-3 1/2 x 4 1/2	23.41	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer	3/2 F Tim	5.10 R-R ²
995	1785	2150	1495d	1685e	1695	118	32x4 1/2	Moon.	Cont..8 R	6-3 1/2 x 4 1/2	27.34	Strom.	Delco.	Delco.	s-p B&B.	R-L.	m Spicer	3/2 F Tim	5.09 R-R ²
995	1785	2150	1495d	1685e	1695	123	31x4*	Moon.	Cont..7 U	6-3 1/2 x 4 1/2	23.44	Strom.	Delco.	Delco.	s-p B&B.	Warner.	m Spicer	3/2 F Tim	5.10 R-R ²
1240	1240	1050	1615e	2090c	1640	121	33x4	Nash.	Own.	6-3 1/2 x 5	25.35	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	3/2 F Own	4.50 R-R ²
915	935	1390	1195d	1445	1445	127	34x4 1/2	Nash.	Own.	6-3 1/2 x 5	25.35	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	3/2 F Own	4.90 R-R ²
915	935	1390	1195d	1445	1445	112	33x4	Nash.	Own.	4-3 1/2 x 5	18.23	Marvel.	Delco.	Delco.	s-p B&B.	Own.	m Own.	3/2 F Own	5.50 R-R ²
2175	2175	2375	2485d	3250	3285	130	32x4 1/2	National.	Own.	6-3 1/2 x 5 1/2	29.40	Rayfield.	West.	Delco.	s-p B&B.	B-L.	m Univ.	F Col.	4.08 R-R ²
995	995	995	1095a	1195	1445	113	31x4	Oakland.	Own.	6-2 1/2 x 4 1/2	18.90	Strom.	Remy.	Remy.	s-p Hoos.	Muncie.	m Mech.	3/2 F Own	4.70 F-L ²
785	795	795	1095d	1395	1395	110	31x4	Oldsmobile.	Own.	6-2 1/2 x 4 1/2	18.15	Zenith.	Delco.	Delco.	s-p B&B.	Muncie.	f Own.	3/2 F Own	5.10 R-R ²
495	495	495	395g	750	795	100	30x3 1/2	Overland.	Own.	4-3 1/2 x 4	19.60	Tillotson	A-L.	A-L.	s-p B&B.	Own.	m Own.	3/2 F Own	4.50 R-R ²
495	495	495	395g	750	795	106	30x3 1/2	Overland.	Own.	4-3 1/2 x 4	19.60	Tillotson	A-L.	A-L.	s-p B&B.	Own.	m Own.	3/2 F Own	4.50 R-R ²
2585	2585	2350	2750e	3275e	3375	126	33x4 1/2	Packard.	Own.	6-3 1/2 x 5	27.34	Own.	A-K.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Own	4.60 F-R ²
3850e	3650	2785	2150a	3625f	3675f	133	33x4 1/2	Packard.	Own.	6-3 1/2 x 5	27.34	Own.	A-K.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Own	4.60 F-R ²
3850e	3650	2785	2150a	3625f	3675f	136	33x5	Packard "Eight".	Own.	8-3 1/2 x 5	36.45	Own.	Dyneto.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Own	4.70 F-R ²
1795	1795	1795	3850	4900f	4950s	143	33x5	Packard "Eight".	Own.	8-3 1/2 x 5	36.45	Own.	Dyneto.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Own	4.70 F-R ²
1995p	1995p	1995p	3850	4900f	4950s	131	33x4 1/2	Paige.	Cont..Spec	6-3 1/2 x 5	33.75	Rayfield.	Remy.	A-K.	m-d Long.	Warner.	m Meen	3/2 F Tim	4.60 R-R ²
1550	1390	1425	1465d	2395i	2395	120	32x4 1/2	Peterson.	Cont..8 R	6-3 1/2 x 4 1/2	27.34	Strom.	Delco.	Delco.	s-p B&B.	Durston	m Hart.	3/2 F Salis	4.50 R-R ²
1985	1985	2090	2260e	3300	3390	126	32x4 1/2	Peerless.	Own.	6-3 1/2 x 5	29.40	Johnson	Delco.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Tim	4.60 F-R ²
2090	2750	2260e	3300	3390	3840	128	33x5*	Peerless.	Own.	8-3 1/2 x 5	33.80	Ball&B.	Delco.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Tim	4.90 R-R ²
5250	5250	5250	6800	7000	7000	138	33x5	Pierce-Arrow.	Own.	6-4 x 5 1/2	38.40	Own.	Delco.	Delco.	m-d Own.	Own.	m Spicer	3/2 F Own	4.25 R-R ²
2535	1695	1745	2415	2195	2195	126	32x4 1/2	Pilot.	IL-S.	6-3 1/2 x 5	29.40	Tillotson	Wagner	Wagner	m-d Hoos.	Muncie.	m Blood.	3/4 F Col.	4.67 R-R ²
2535	1695	1745	2415	2195	2195	126	32x4 1/2	Pilot.	IL-S.	6-3 1/2 x 5	29.40	Tillotson	Wagner	Wagner	m-d Hoos.	Muncie.	m Blood.	3/4 F Col.	4.67 R-R ²
2300	2350	2350	3090d	3050	3250	124	32x4 1/2	Premier.	Own.	6-3 1/2 x 5	27.34	Strom.	Delco.	Delco.	s-p B&B.	B-L.	m Spicer	3/2 F Tim	4.58 R-R ²
1335	1335	1545d	3090d	3050	3250	124	32x4 1/2	R & V Knight.	Own.	6-3 1/2 x 5	29.40	Strom.	A-L.	A-L.	s-p B-L.	B-L.	m Spicer	3/2 F Tim	5.40 R-R ²
3200e	3200	3200e	4000	4000	4000	120	32x1*	Reo.	Own.	6-3 1/2 x 5	24.34	Rayfield.	N.E.	N.E.	m-d Own.	Own.	m Own.	3/2 F Own	4.70 R-R ²
1615	1595	2035	2135	2135	2135	131	32x4 1/2	Revere.	Monsen.	4-4 1/2 x 6	30.63	Strom.	West.	Bosch.	m-d B-L.	B-L.	m Spicer	3/4 F Std	3.44 R-R ²
2635	2185	2085	2750e	3285	3585	117	32x4*	Rickenbacker.	Own.	6-3 1/2 x 4 1/2	23.44	Strom.	Bosch.	Bosch.	s-p Own.	Own.	m Mech.	3/4 F Own	4.60 F-R ²
3885	3485	3800	3650e	4650	4650	118	32x4 1/2	Roamer.	Cont.12XD	6-3 1/2 x 5 1/2	29.40	Strom.	West.	Split.	s-p B&B.	Fuller.	f M&E.	3/4 F Tim	4.60 R-R ²
3885	3485	3800	3650e	4650	4650	138	32x4 1/2	Roamer.	Cont.12XD	6-3 1/2 x 5 1/2	29.40	Strom.	West.	Split.	s-p B&B.	Fuller.	f M&E.	3/4 F Tim	4.60 R-R ²
3785	895	975	1175	1275	1275	128	32x4 1/2	Roamer.	Due..G1	6-3 1/2 x 5 1/2	28.90	Strom.	West.	Bosch.	m-d B-L.	B-L.	f M&E.	3/4 F Tim	4.63 R-R ²
11400	10900	11450	1275	1275	1275	112	31x5 1/2	Rollin.	Own.	4-3 1/2 x 4 1/2	16.90	Tillotson	Dyneto.	Conn.	s-p B&B.	Muncie.	f Snead.	1 1/2 F Salis	5.10 F-R ²
1615	1615	2645d	2615	2615	2615	143 1/2	33x5	Rolls-Royce.	Own.	6-4 1/2 x 4 1/2	48.60	Own.	Special.	Bosch.	c Own.	Own.	m Own.	f Own	3.72 R-R ²
985	985	2425a	3585	3985	3985	136	33x5	Sayers Six.	Cont..6J	6-3 1/2 x 5	33.75	Strom.	Delco.	Delco.	s-p B&B.	B-L.	m Cle.	f Tim	4.91 R-R ²
2750	2750	2750	3585	3985	3985	112	31x4	Seneca.	Lye..CF	4-3 1/2 x 5	21.03	Zenith.	A-L.	A-L.	s-p B&B.	Own.	m Univ.	f Pen	4.50 R-R ²
490	490	610d	640	785	p935d	102	30x3 1/2	Stanley.	Own.	2-4 x 5	13.00	None.	Bijur.	None.	None.	None.	None.	3/2 F Own	1.50 R-R ²
1750e	1750	1445e	2195g	2350	d2195f	119	33x4 1/2	Star.	Cont. Spec	4-3 1/2 x 4 1/2	15.63	Tillotson	A-L.	A-L.	s-p Own.	Warner.	m Spicer	3/4 F Tim	4.87 R-R ²
2395	2395	2195g	3395	3395	3395	130	33x5	Stearns-Knight.	Own.	4-3 1/2 x 5 1/2	22.50	Schebler.	A-L.	A-K.	m-d Own.	Own.	f Cli.	3/2 F Own	4.50 R-R ²
1295	1295	1595	1850e	2250	2250	117	32x4	Stearns-Knight.	Own.	6-3 1/2 x 5	25.35	Schebler.	A-L.	A-K.	m-d Own.	Own.	f Cli.	3/2 F Own	4.70 R-R ²
1750	1595	1850e	2250	2250	2250	117	32x4	Stearns-Knight.	Own.	6-3 1/2 x 5	25.35	Strom.	Delco.	Delco.	s-p B&B.	Meen.	m Mech.	1 1/2 F Tim	5.10 R-R ²
1985	1985	2200e	2800	d2750p	2800	124	33x4 1/2	Stephens.	Own.	6-3 1/2 x 4 1/2	25.35	Strom.	Delco.	Delco.	s-p B&B.	Meen.	m Mech.	1 1/2 F Tim	5.30 R-R ²
1025	1045	895g	1195	1485	1395d	125	32x4 1/2	Sterling-Knight.	Own.	6-3 1/2 x 4 1/2	25.35	Strom.	West.	West.	m-d Fuller.	Fuller.	f Chim.		

a **SIX**
at **\$795**

f. o. b. Lansing



PRESIDENT AND
GEN'L. MGR.

Frint
MOTOR CAR CO.
Oldsmobile

Factory Distributor

MILWAUKEE, WIS.

December 31st, 1923.

LONG DISTANCE
BROADWAY 6502

Olds Motor Works,
Lansing, Michigan.

Attention of Mr. Peasley.

Gentlemen:- Subject: A Real Company and a Real Car

It has indeed been a real pleasure to distribute this new Model 30 Oldsmobile, for we have been able to secure our contract allotment and dispose of it with the smallest amount of effort we have ever used in disposing of a like number of cars in the month of December.

The car itself is wonderful and the co-operation of the Olds Motor Works has been the finest we have ever received from any motor car company. We cannot recommend too highly this Oldsmobile proposition to any dealer or distributor.

Yours very truly,

L. D. Frint
L. D. Frint
President and General Manager.

IDF
OW.

*"A Real
Company
and a
Real Car"*

—and that's just what every good merchant wants—prompt deliveries of his full contract allotment of cars and quick easy sales. Add to that the satisfaction of selling "a real car" for "a real company", and you have a top-notch selling proposition, haven't you? Our dealers think so. Inquiries invited.

OLDS MOTOR WORKS, LANSING, MICHIGAN

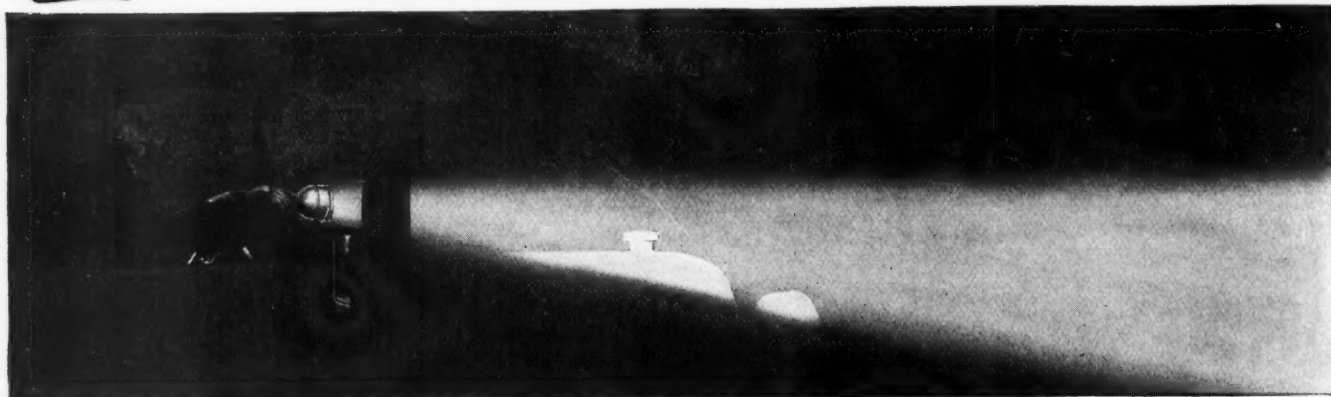
OLDSMOBILE~SIX

PRODUCT OF GENERAL MOTORS

INSHIELD

TRADE MARK REGISTERED U.S. PAT. OFF.

DRIVING LIGHT



INSIDE THE WINDSHIELD - NO GLASS TO CUT - NO SPECIAL TOOLS

*In Two Popular
Fast-Selling Models.*

INSHIELD "8"

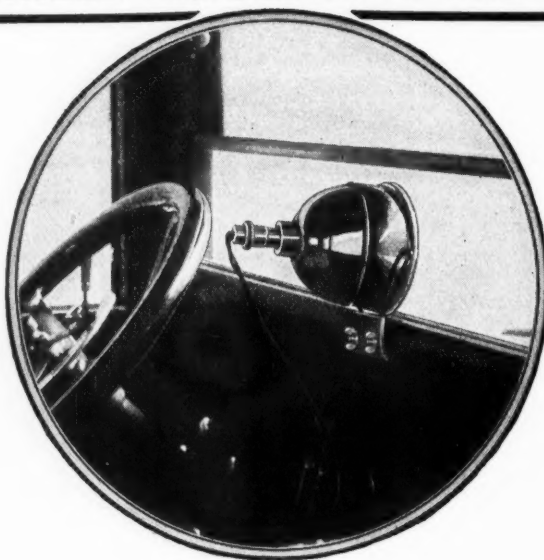
In nickel or black enamel baked-on, 4½ in. in diameter. Fits any car.

\$7.50

INSHIELD SENIOR

Heavily nickeled, 5½ in. in diameter. A beautiful light for the big cars.

\$10.00



There is only one genuine Inshield. We own and control all patents pertaining to design, construction, and installation of the Inshield type of driving light.

PATENTED

November 8, 1921—

October 30, 1923

We will vigorously protect our patent rights.

The Inshield Does Not Damage the Windshield

The windshield glass is never endangered when you attach or use the Inshield Inner controlled Driving Light.

It is attached to the windshield frame. No glass cutting is necessary. No special tools needed. The entire lamp is inside the windshield. It can be moved or removed without leaving unsightly marks.

The Inshield is instantly available as a trouble light. It works smoothly and positively at any angle. You can open or close the windshield without disturbing the Inshield.

Made of sheet brass heavily nickeled or enameled. Fitted with genuine silver reflectors, 21 candle power Mazda precision tipless bulbs. Bulb or lens easily changed without dismantling the lamp.

Genuine Inshields made only by

THE INSHIELD PRODUCTS COMPANY

Dept. 8

TOLEDO, OHIO

The Files for a Busy Shop

NICHOLSON Files are cost-cutters in shops where hours are figured in terms of dollars and cents.

To the mechanic, they're labor savers :

---Ready-sharp, requiring no "breaking in."

---Fast-cutting and accurate, conserving energy.

To the boss, they're a real investment:

---Edgeholding, necessitating fewer replacements.

---Trustworthy insuring a better job.

For producing, maintaining or repairing motor cars and trucks---AT A PROFIT---you must have the proper assortment of files in your shop.

There's a NICHOLSON File (or Rasp) for every purpose. And the NICHOLSON trade mark is a guarantee that it's right!

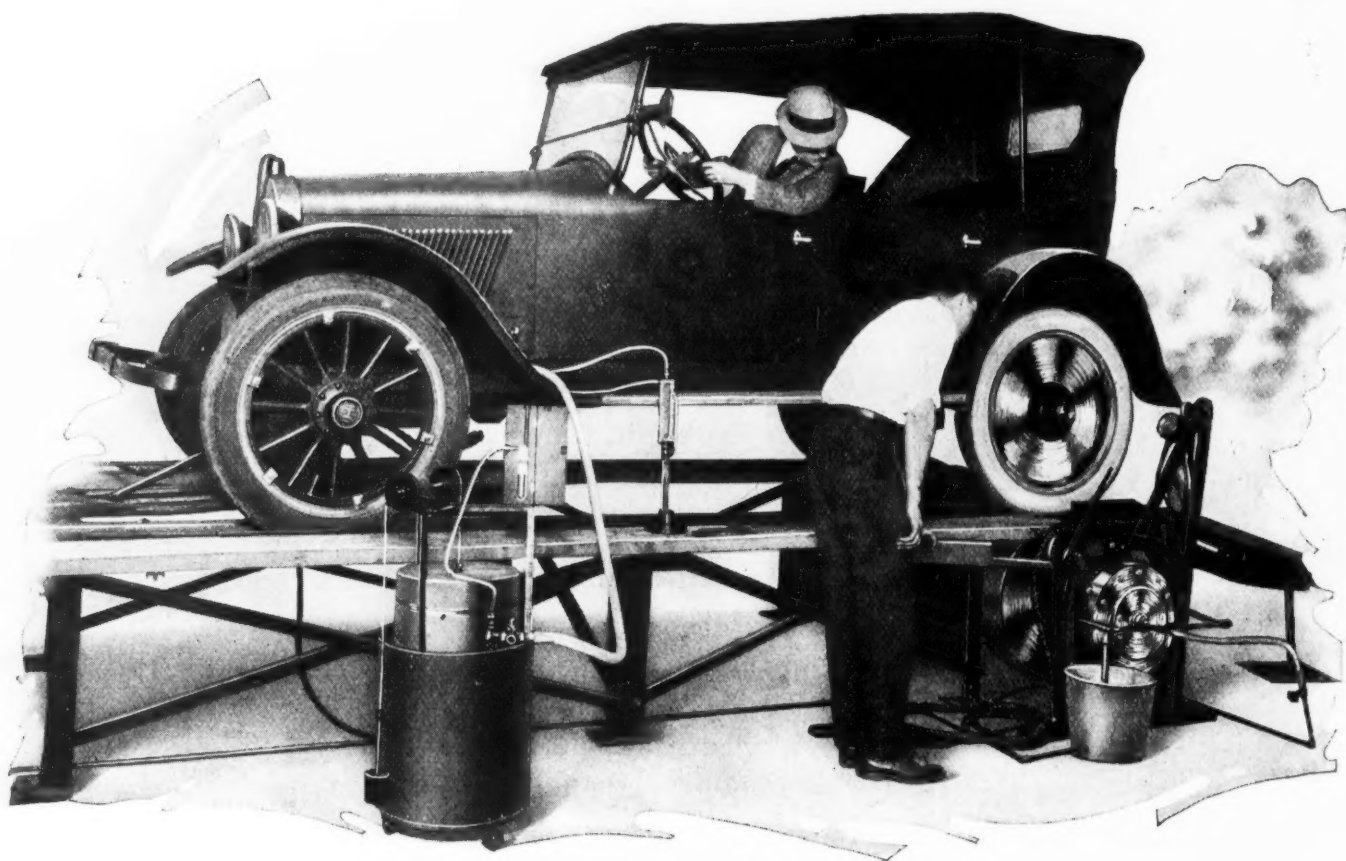
NICHOLSON FILE CO.

Providence, R. I., U. S. A.

NICHOLSON FILES

~ a File for Every Purpose

NICHOLSON
U.S.A.
(TRADE MARK)



Authentic Facts about the

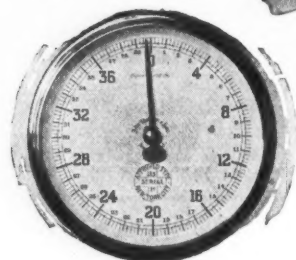
Wasson Motor Check

that affect your business

There has been a great deal of talk about it—some of it misinformed. It has been discussed in trade papers by able engineers. It has not been possible to keep private the remarkable tests it has been put through in a number of prominent service stations. This is the first official statement to the trade and the automotive industry, giving the authentic facts about Wasson's remarkable invention—



Wheel revolutions



Torque or load



Slippage

Three dials

that give a positive record of car efficiency at any speed under any load.

THE Wasson Motor Check is a complete testing unit that measures with scientific accuracy the performance of a motor in every essential factor; including the following most important items: horsepower delivered at the rear wheels, slippage past rings and pistons in cubic inches per minute, compression in each cylinder; dilution of oil in percentage. If the motor is not right it tells why and where with mechanical precision.

Repair men can diagnose any case by a careful interpretation of the Motor Check findings. That saves all needless expense of cut-and-try methods. After the engine has been brought back to standard—the Motor Check proves the job.

Dealers can place a true performance value on

trade-in-cars by using the Motor Check. It can't fake the result. It provides a basis of confidence for the buyer and seller both. You can honestly certify car condition.

Distributors of motor accessories can prove the relative value of their products by comparative tests on actual cars—under any conditions of load or speed desired. No rule-of-thumb—but specific proof.

Producers of fuel and lubricants can show by graphic demonstrations the quality of their product and its most efficient use.

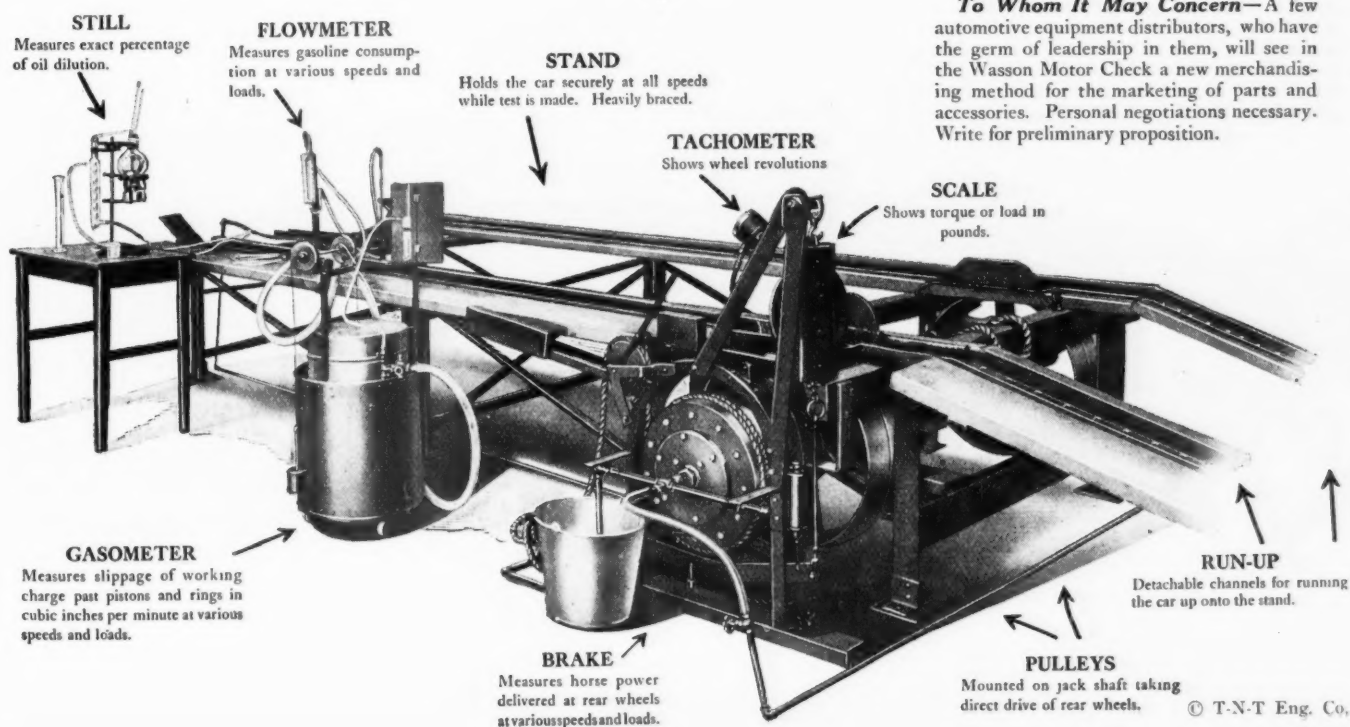
Fleet owners can maintain every unit of their fleet, at minimum expense, by a simple system of periodic tests on the Motor Check. No waiting until trouble develops.

Car manufacturers can establish standards of car performance and life by Motor Check measurement and Service Stations can repair or adjust to this standard by following Motor Check indications. Not S. A. E. — but *as is*!

In a word it discloses cause and effect of motor inefficiency. *Cause and Effect*—the scientific basis for all corrective work—in mechanics as in medicine. Isolate the trouble and you can cure it.

The Wasson Motor Check is a basic contribution to the automotive industry, and its adoption and intelligent use will answer the car servicing problem, the reconditioning problem and the used car problem.

Wasson Motor Check stations are now in operation at Washington, D. C., Boston, Rochester, Newark, Orange, N. J., Baltimore.



Skeleton Description

The essential apparatus consists of (a) a rigidly built stand, with run-up, on which the car is anchored; (b) an adjustable brake upon which the rear wheels are driven, registering speed and horsepower on simple dials; (c) a gasometer attached to breather, measuring slippage past the pistons; (d) a flowmeter measuring fuel consumption under any load conditions; (e) a "still" to measure crank case dilution; (f) a gauge to establish compression; (g) spray valve and condensing plate to determine at what motor speed liquid oil is passed.

Supplemental equipment includes a gauge to establish back pressure and muffler conditions; an apparatus to analyze (for per cent of CO₂) the exhaust gases.

Time—A complete test may be run in less than one hour.

Weight—The Motor Check scales a little under 2000 lbs.

Size—Stand with run-up—25 ft. x 6 ft. x 3 ft.—Working space required about 300 sq. ft.

Service Men—Car Dealers

YOU have been gambling with your profits. It has been a game until now. The Wasson Motor Check gives you a perfect measuring rod to value a used car, to figure a repair job and to prove up your work. It offers the good mechanic an incalculable advantage—as the X-ray helps the surgeon. One Service Manager said—"Here's the end of hit or miss methods with me—I am in a sound business at last. This invention of yours puts competition on a 'good work' basis instead of a 'guess-work' basis."

The Wasson Motor Check is leased to the trade under specific service provision, by the T-N-T Engineering Co. The Wasson Motor Check, the testing process, and the T-N-T restoration method are fully covered by patents pending in the U. S. Patent Office. Send for engineering data and terms.

T-N-T ENGINEERING CO., INC., Newark, N. J.

Manufacturers of T-N-T Piston Rings and the

Wasson Motor Check

To Whom It May Concern—A few automotive equipment distributors, who have the germ of leadership in them, will see in the Wasson Motor Check a new merchandising method for the marketing of parts and accessories. Personal negotiations necessary. Write for preliminary proposition.

DO YOU OWN YOUR OWN BUSINESS?

Does some big-production sales manager crack the whip over you?

Are you forced to overstock with new cars?

Are you able to *keep* the money you make?

Or is it tied up in used cars?

And dissipated in service?

A business man *must* answer these questions.

Your success depends upon your being free from the things that keep you from owning your own business.

Auburn offers you this opportunity.

Auburn's policy is of a character not to *break* dealers but to *make* them.

Its franchise affords an opportunity to make more money on a smaller number of units of sales.

The Auburn dealer is *independent*. Everything done is for your good. You do not have to punch a factory time clock or wear some big-production sales manager's uniform.

You have a big share in shaping the Auburn factory policy. You are listened to and counseled with. You make money and you can *keep* it. Service costs are negligible and you have a wonderful line of completely equipt sixes. Let us show you how to become a happy, money-making independent business man.

Wire or write us.

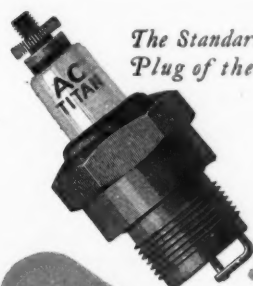
AUBURN AUTOMOBILE COMPANY
Auburn, Indiana



AUBURN

MOTOR CARS

*The Standard Spark
Plug of the World*



More than 85 per cent of all cars and trucks produced in this country, Fords excluded, are factory equipped with AC Spark Plugs. Among these cars are:

Buick	Hupmobile
Cadillac	Jewett
Chalmers	Jordan
Chandler	LaFayette
Chevrolet	Marmon
Chrysler Six	Maxwell
Cleveland	Nash
Dodge Brothers	Oakland
Dort	Oldsmobile
Durant	Paige
Essex	Peerless Six
Hudson	Star
	Yellow Cab

This tremendous, ready-made market for AC's is right at your door and will always be there in ever-increasing size.

There is a type and size for every motor.

The dealer who stocks the well-known AC Spark Plugs is handling fast-moving, profit-making merchandise, and his market is assured by factory equipment business.

The AC 1075 for Fords is a big seller because it is a better plug for Ford engines—it satisfies the owner and makes money for the dealer.

SPARK PLUGS SPEEDOMETERS



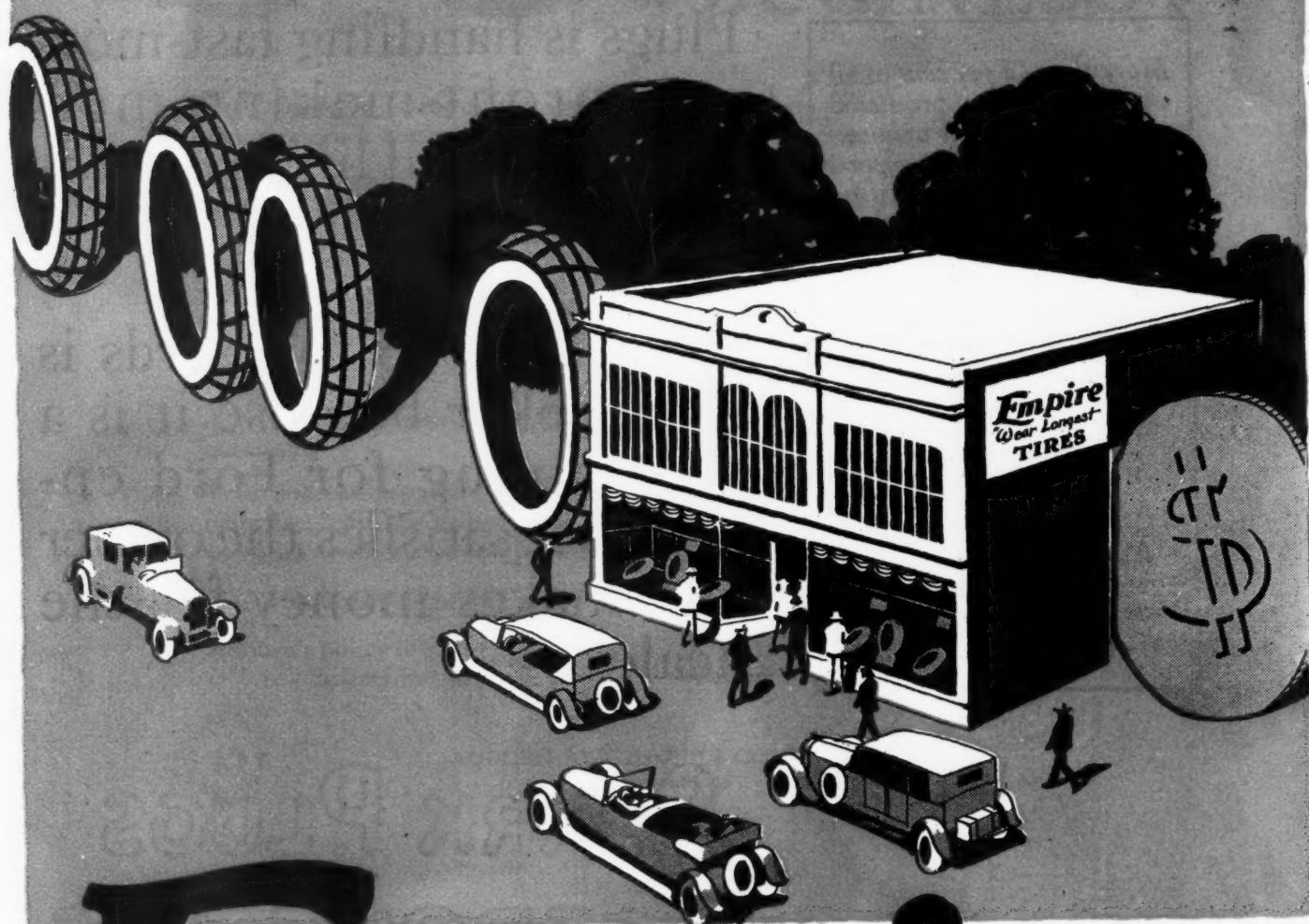
*The accurate, easily installed
Ford Speedometer can be
sold to every Ford owner*

AC Spark Plug Company, FLINT, Michigan

Makers of AC Spark Plugs—AC Speedometers

U. S. Pat. No. 1,135,727, April 13, 1915. U. S. Pat. No. 1,216,139, Feb. 13, 1917
Other Patents Pending

*Not a dealer
overstocked*



Empire
"Wear Longest" **TIRES**

A LITTLE more time—a little more care limits the production of Empire Tires but it enables us to merchandise them so systematically that we can truthfully say not an Empire dealer in the land is overstocked.

This statement isn't guess work, nor is it mere words. Questionnaires recently sent out showed that at the end of last year practically every Empire had been sold. Empire distributors enter 1924 with new stocks and the comforting knowledge that they can gauge their turnover to the penny and that each Empire sold means a satisfied and permanent customer.

DON'T DELAY

The demand for Empire Tires far exceeds the supply. Empire distributors are urged to place their orders immediately. Responsible dealers in communities where we have no official agency, owe it to themselves to write for our 1924 Exclusive Dealers proposition.

EMPIRE TIRE AND RUBBER CORPORATION
TRENTON, N. J.



The Returns Are In



THE profits that Willys-Overland merchants made in 1923 have all been counted. An amazing story of success is ready to be told.

It was a landslide! All over the country—in the tiniest hamlets—in the largest cities—they voted for Willys-Knight and Overland. Orders were the ballots that returned Willys-Overland merchants winners in an astonishing majority of communities.

Some of Them Started with Practically Nothing!

Anderson and Clausen started in Chicago in 1916 with \$3,000 and split \$100,000 in 1923. Overland-Hodges Co., of Linton, Indiana, showed a net profit of \$12,382 in the first five months of 1923. Phil Pomeroy, of Miami, Florida, started two years and a half ago with \$15,000, and in 1923

netted \$19,325. The Wentworth Motor Co., of Bangor, Maine, has piled up a \$116,000 surplus in five years—starting with a capital of \$3,600.

The Public Knows and Likes These Cars!

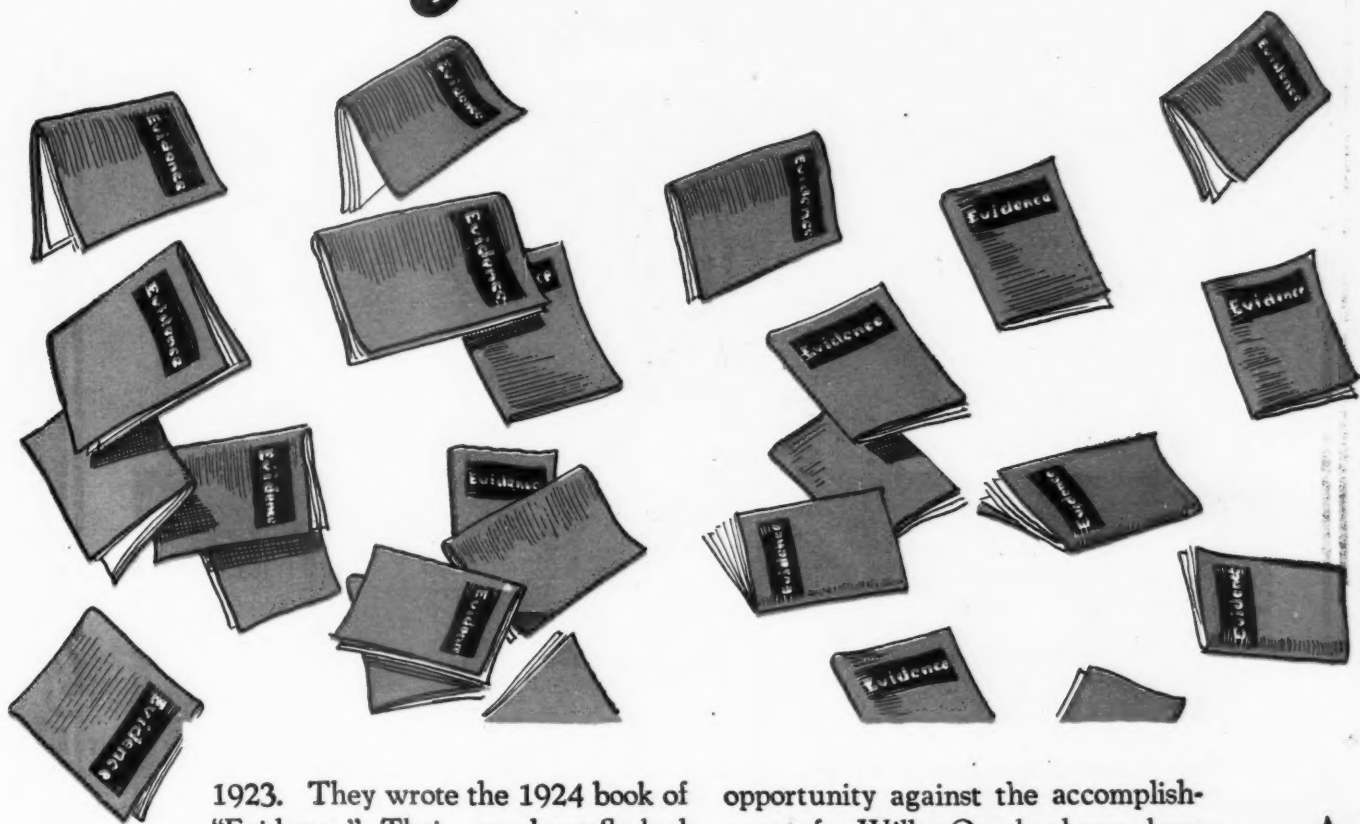
Why this tremendous outpouring of popular preference for Willys-Overland merchandise? Good merchandise first. Merchandise that requires less service. High resale value. Cars that cost less to buy and run, and run better. The dominating, overwhelming merchandising and advertising done by the factory. *Everlastingly presenting the facts!*

Send for This Book!

Willys-Overland merchants have told us the reasons and the methods that brought them unparalleled success in

WILLYS-

The Profits Are Counted



1923. They wrote the 1924 book of "Evidence." Their pens have flashed a message of enthusiasm that should be read by everyone in any way interested in the automobile business.

"Evidence" teems with facts and figures. It shows that a lot of Willys-Overland merchants literally made fortunes in a single year.

"Evidence" is the Inside History of Success

From every section of America, the facts are there! You can check your

opportunity against the accomplishment of a Willys-Overland merchant who does business in the same kind and size of a community as your own. Who invested the same amount of money as you have to invest. Dealers now handling a line to which the public is indifferent can check over the facts and see what another dealer has done with a line for which there is eager public acceptance.

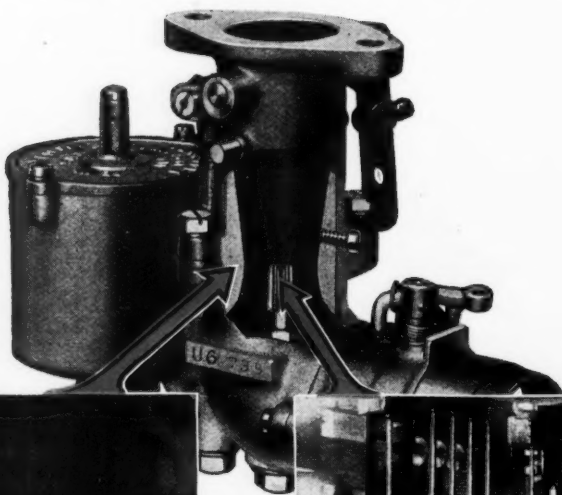
Send for "Evidence" today. It is an inside history of the dealers' side of the automobile business.

WILLYS-OVERLAND, Inc., TOLEDO, OHIO
Willys-Overland Sales Co. Ltd., Toronto, Canada

OVERLAND

ZENITH

The "Vitals" of the Carburetor



Measuring chokes at the Zenith factory. "Go" and "no go" gauges insure correct sizes of choke tubes within limits of $\frac{1}{2}$ of one per cent. This insures exact uniformity in performance, in the hands of users.

ZENITH
CARBURETOR

All Zenith jets are tested by these machines. Ordinary methods of measurement are not accurate enough; the "flow method" is used, by which the actual capacity of the jets is measured to the fraction of a drop.

With such accurate methods and machines as described above, it is little wonder that the Zenith carburetor, once properly regulated, gives perfect and unvarying performance forever after; and that all Zenith-equipped cars in production, duplicate the standards set by test cars.

There is a Zenith, built to these precision standards, for every motor.

ZENITH-DETROIT CORPORATION

Manufacturer of

ZENITH CARBURETORS

DETROIT

MICHIGAN

Branches:

NEW YORK

CLEVELAND

CHICAGO

Service Stations in over 800 cities



Here's the plug for YOU to sell:

A big, sure-firing, long-lived, one-piece plug that you can always pin your faith to—

It's a **QUALITY** plug through and through — designed right, built with the utmost care, thoroughly inspected and tested.

The insulator is made of "Ambosite," a new non-clay chemical composition (not porcelain) of remarkable strength and insulating properties. Intense heat or the slip of a wrench won't break it — high electric voltage can't puncture it.

Five types service all popular cars—you can carry a small stock and get quick turnovers!

Be sure to sell the genuine Bosch Plug—it's the plug with the red body, and with the Bosch Trade Mark on the insulator.

Prices, Ford Size, 75c, Regular Sizes, \$1.00

Wire for sample set C. O. D. and liberal sales proposition.

AMERICAN BOSCH
Main Office and Works: Springfield, Mass.



MAGNETO CORP.
Branches: New York Chicago Detroit
San Francisco

SPARK PLUGS



The New **Stewart** Steady Sweep
Windshield Wiper
 (Electrically Operated)



While parking for a short time during a heavy snowstorm, the driver can leave the Stewart working to keep the windshield glass clean, with no danger of its being covered with frozen sleet or snow before his return.

An automatic windshield wiper, electrically operated, independent of the engine, so that "stepping on the gas" has no effect on its powerful, steady sweep. The Stewart cleans the glass thoroughly, with clock-like regularity, at all times.

Operated from car's battery. Very economical. Requires but one and a half amperes. Can be furnished for all cars.

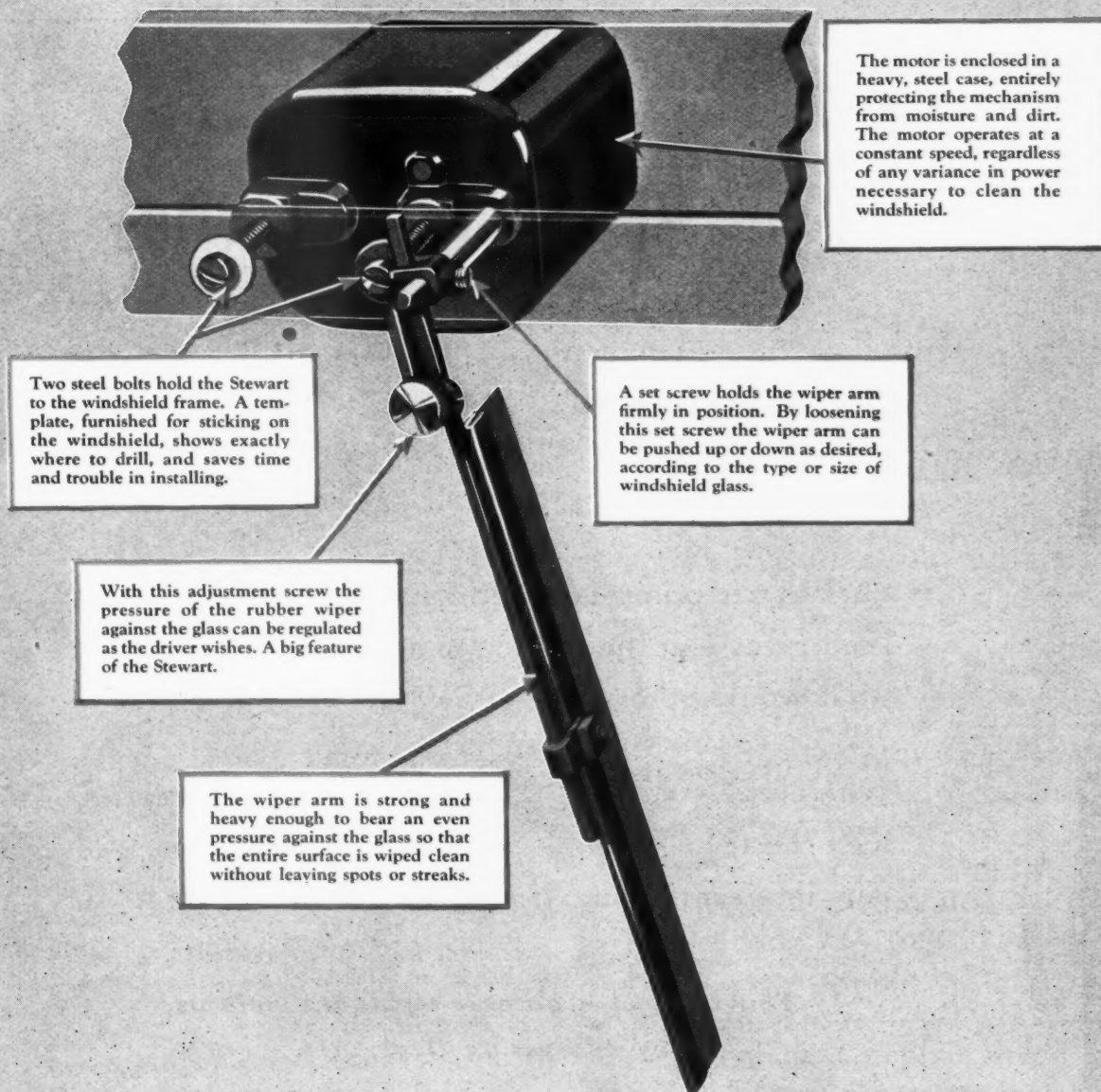


Women drivers will like the automatic operation of the Stewart Windshield Wiper which, by keeping the glass clear at all times, will enable them to drive in perfect safety in rainy weather when streets are slippery.

STEWART-WARNER SPEEDOMETER CORPORATION ~ CHICAGO, U. S. A.

Stewart Windshield Wiper

(Electrically Operated)



The motor is enclosed in a heavy, steel case, entirely protecting the mechanism from moisture and dirt. The motor operates at a constant speed, regardless of any variance in power necessary to clean the windshield.

Two steel bolts hold the Stewart to the windshield frame. A template, furnished for sticking on the windshield, shows exactly where to drill, and saves time and trouble in installing.

A set screw holds the wiper arm firmly in position. By loosening this set screw the wiper arm can be pushed up or down as desired, according to the type or size of windshield glass.

With this adjustment screw the pressure of the rubber wiper against the glass can be regulated as the driver wishes. A big feature of the Stewart.

The wiper arm is strong and heavy enough to bear an even pressure against the glass so that the entire surface is wiped clean without leaving spots or streaks.

DEALERS!

Increase your spring sales by displaying this big rainy weather business-getter.

Price, complete, \$7.50
(Western price \$7.75)

STEWART-WARNER SPEEDOMETER CORPORATION - CHICAGO, U. S. A.

SOONER OR LATER YOU, TOO, WILL USE A BOWSER



Chief Sentry—
Known from coast to coast as a trade bringer and a money-maker.

Stop 175 Cars And Get Their Money

If you could stop 175 cars, and sell them gas and oil; by putting a big red Bowser pump on your curb, you would add \$2800 to \$3400 a year to your net income, and pay for the pump the first year, besides.

A Bowser pump is an effective trade-bringer, too, and gives you the chance to sell many a repair job that would otherwise get away.

There's no mystery about it, just plain mathematics. Get the facts, then decide whether the money is of any interest to you. If it is, we'll help you get it.

*You will get a quicker reply, and help us,
by addressing Dept. A14.*

S.F. BOWSER & COMPANY, Inc.
Pump and Tank Headquarters
FORT WAYNE, INDIANA.
Sales and Service Offices and Representatives Everywhere

SOONER OR LATER YOU, TOO, WILL USE A BOWSER

BOSCH



ELECTRIC Windshield Wiper

PRICE \$9.50

Here's good news for live dealers!

The Bosch Electric Windshield Wiper is now available—a perfect automatic device operated by electricity obtained from the battery. It is simple, rugged and dependable — never sticks or gets out of order.

It's quiet—no train of gears to hum or rattle — no pumping noises—no clicks or clatter. It's powerful — plows off snow, slush and rain when other de-



vices falter and stop. The speed of its sweep is constant — not affected by engine or car speeds. It costs nothing to run — uses less than $1\frac{1}{4}$ amperes.

It's a cinch to sell—all you have to do is show it, explain that it is a Bosch Quality Product backed by the Bosch Guarantee.

A sample will be sent at quantity discounts, C. O. D., with full sales proposition if you wire or write promptly.



AMERICAN BOSCH MAGNETO CORPORATION

Main Office and Works: Springfield, Mass. Branches: New York Chicago Detroit San Francisco



AMERICAN BOSCH MAGNETO CORPORATION

Improves the Car Pleases the Owner Pays You Well

That Gabriel Snubbers do very greatly improve the riding qualities of any car is amply proven by the fact that more than 2,000,000 cars are Gabriel equipped.

They also save the car from the wear and tear of road shocks—and so cut down servicing expenses.

Naturally, therefore, they please car owners—a Good Will factor that helps your whole business.

The profits on sales are liberal—due to the new Gabriel Sales Proposition.

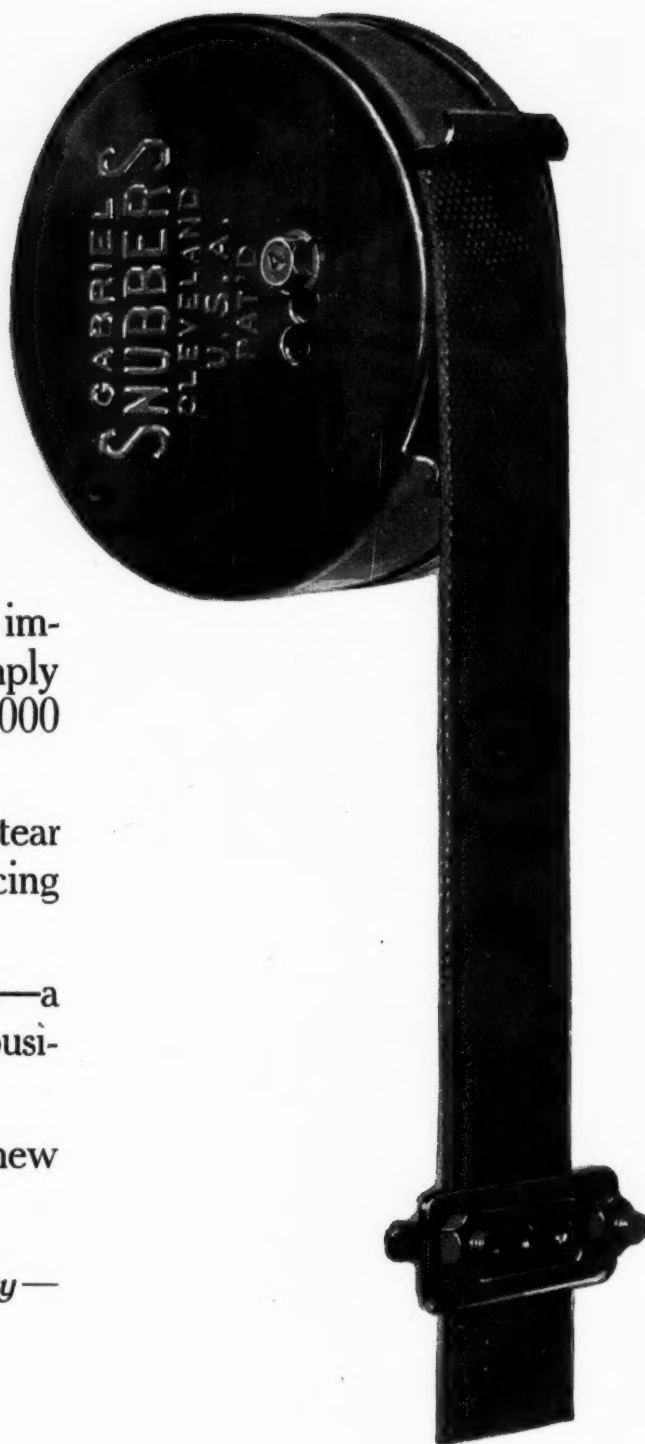
*Write the Gabriel Distributor in your territory—
or to us direct for full details.*

GABRIEL MANUFACTURING COMPANY

1415 East 40th Street • Cleveland, Ohio

Gabriel Manufacturing Co. of Can., Toronto, Ont.

~ Sales & Service Everywhere ~



Gabriel

**GABRIEL
SNUBBERS**

**Greater
Riding
Comfort**

Snubbers

Every One Needs a Bethlehem De Luxe!



How many will you sell?

ONE million Bethlehem Radiator Caps will be sold in 1924. Bethlehem Radiator Caps made history in 1923. Dealers who ordered a dozen "on suspicion" re-ordered in half-gross and gross lots. Some we had to disappoint. There just weren't enough Bethlehem Radiator Caps to go around.

If you are going to handle the Bethlehem line of auto accessories in 1924, and this is an invitation to every jobber and dealer of auto accessories to handle the line, let a Bethlehem salesman tell his "more profit" story right now. Car dealers are "dressing up" show-room models with Bethlehem De Luxe Caps. They add the final touch and assist in selling the car.

Bethlehem De Luxe Caps-Sell on Sight!

Bethlehem national advertising starts in April and runs continuously in The Saturday Evening Post and farm publications. Window displays are available and dealer folders are furnished for the asking; also a mahogany-finish stand for counter display of Bethlehem Caps. You make a profit that's more than comfortable on each sale. Drop me a postal today asking for sample cap and discount sheet. Spring with its increase of auto accessory business is not far off!

Investigate the possibilities of this line of Profit-Makers!

Bethlehem
QUICKWAY
Socket Wrench Sets

Bethlehem
Spark Plugs

Bethlehem
TOURACK
Luggage Carrier.

Write today, for catalog and trade discounts.

De Luxe Cap for Fords, Gray and
others retails for\$3.50
Chevrolet, Star, Oldsmobile Six, Essex,
Overland and others retails for.....\$4.00
For other cars retails for.....\$5.50

Chas. Schwab
President

BETHLEHEM SPARK PLUG COMPANY, Bethlehem, Penna.

BETHLEHEM

De Luxe

RADIATOR CAPS

Arrow Head

Pistons
Piston Pins
Axle and Drive Shafts



**Dependable
Products**

ARROW HEAD STEEL PRODUCTS CO.

MINNEAPOLIS, MINN., U.S.A.

FYRAC

Z Spark PLUGS FOR FORDS



NEW!

Fyrac name—Fyrac quality—Fyrac guarantee. A top-notch plug at a rock-bottom price, spelling SALES and PROFITS for dealers. Advertised regularly in The Saturday Evening Post. Order today from Fyrac Mfg. Co., Rockford, Illinois.

Fyrac Regular Plugs, one INCH firing surface, \$1 each. Made by the makers of the Fyrac Night Guide, the super windshield spotlight

The New Low Prices

Now ~~\$1.25~~
75¢
each



The original compression ring for replacement. Its great flexibility and equal tension mean better performance in worn cylinders.

Now ~~\$1.00~~
50¢
each



The original oil reservoir ring for oil-pumpers. Collects excess oil on each down stroke and empties on each up stroke, which ordinary grooved rings cannot do. Use one in each piston.

are increasing sales and profits

for cylinder regrinders, repair shops, service stations and dealers everywhere — — — because the drastic price reductions made on the famous McQuay-Norris Leak-Proof and Superoyl Piston Rings have put them within reach of every pocketbook.

Get this picture of sales opportunity!

Leak-Proof and Superoyl Rings for such cars as
FORDS
CHEVROLETS only **\$8.00**

Remember

The best profits are in the best parts. Poor replacement parts can ruin a good mechanical job.

Are you getting your share?

MCQUAY-NORRIS MFG. CO., General Offices, St. Louis, U. S. A.
Factories: St. Louis, Indianapolis, Connersville, Ind., Toronto, Canada

McQUAY-NORRIS

PISTON RINGS - PISTONS - PINS - BEARINGS

**The Right Tire
The Right Price
A Known Value**



When it's Time to Re-Tire
Get a Fisk
Trade Mark Reg. U. S.
Pat. Off.

THERE is a daily increasing demand for a tire of known quality and reputation selling at a low price.

The millions who have been paying practically the price of a Premier Cord for inferior unknown tires are recognizing the wisdom of buying a product of known value.

From the day Premiers were introduced they have delivered dependable low cost mileage. When you sell a Premier you have made another satisfied customer. And satisfied customers are a dealer's greatest asset.

The price is right—the product is right and it bears a name of the best—a combination that means profit to any dealer selling Fisk Premiers.

The Fisk Tire Company, Inc.

Chicopee Falls, Mass.

**Sell
Fisk Premiers**

Sell the car owner

When you show the United Air Cleaner to a customer you can truthfully say—"Dust is a greater enemy of the automobile or truck than fire or theft."

"If you keep the dust out of your engine you save the great expense items of up-keep known as 'Carbon,' 'Bearing Troubles,' 'New Rings,' 'Oil Pumping,' 'Cylinder Regrinding,' 'Valve Lapping,' etc."

So, The United Air Cleaner is the greatest insurance a car owner can buy. You can sell it to him and make a friend as well as a good profit.

DUST INSURANCE

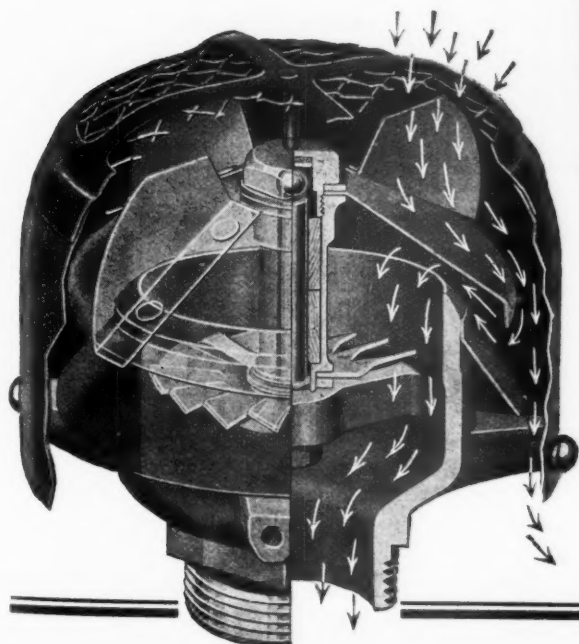
To the automobile and truck owner: the United Air Cleaner is insurance against motor deterioration and depreciation.

When you realize that a body of air one mile long and a foot square is breathed into the motor every hour it is running, you will appreciate this.

Dust is sand and abrasive that sores the cylinder walls and grinds the bearings.

Insure against it with

**The UNITED
AIR CLEANER**
Dustless Air to the Motor



THIS CUT-AWAY VIEW IS
THREE-FOURTHS ACTUAL SIZE
(1" SIZE)

Weights only 18 ounces.

Measures 4" x 4 1/4" over all.

Does not reduce engine power.

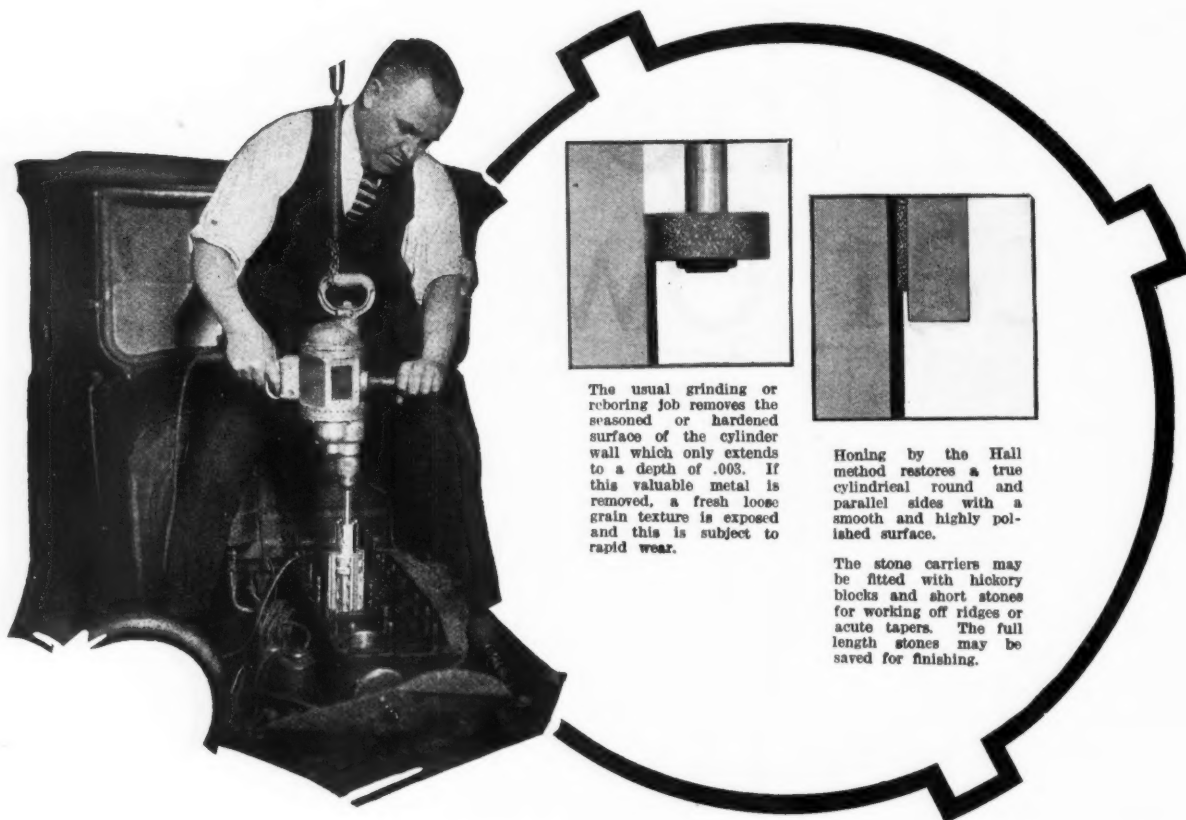
Requires no attention, no emptying, filling, oiling or adjusting whatever.

Is entirely automatic, silent, sturdy and simple (one moving part).

Removes all abrasive matter from the indrawn air.

Inexpensive.

United Mfg. & Distributing Co.
9703 Cottage Grove Ave.
Chicago



The usual grinding or reborring job removes the seasoned or hardened surface of the cylinder wall which only extends to a depth of .003. If this valuable metal is removed, a fresh loose grain texture is exposed and this is subject to rapid wear.

Honing by the Hall method restores a true cylindrical round and parallel sides with a smooth and highly polished surface.

The stone carriers may be fitted with hickory blocks and short stones for working off ridges or acute tapers. The full length stones may be saved for finishing.

The Seasoned Metal Is But Skin Deep—Don't Waste It

The shop that is equipped with a Hall Cylinder Hone can handle reconditioning jobs at a greater profit and offer greater satisfaction to the owner.

The Hall Hone saves you time and makes the flat rate profitable because the work can be done on the chassis and the car occupies your floor space for a shorter period.

He will also know that his car is now in good condition for a longer period of service than originally because the seasoned metal—the wear resisting surface that was developed on the cylinder walls has not been removed but has been retained sufficiently to insure perfect performance and long life in this vital part of the motor.

This appeals to the owner because his car is not tied up and he gets a first class job at a price that is not burdened with time charges for taking down and assembling.



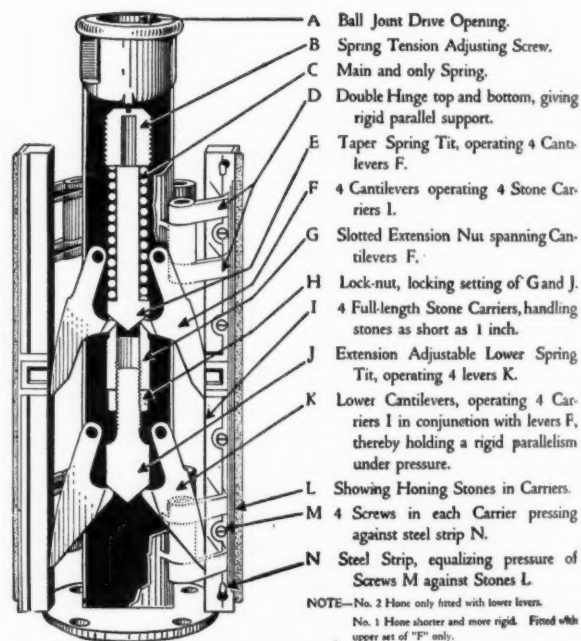
Leading automotive engineers recommend the use of the Hall Cylinder Hone for these reasons. Buick have catalogued and equipped with Hall Hones.

Write for our free booklet, "The Scientific Application of Hall's Cylinder Hone." It gives full details.

THE HALL CYLINDER HONE COMPANY

435 DORR STREET

TOLEDO, OHIO



- A Ball Joint Drive Opening.
- B Spring Tension Adjusting Screw.
- C Main and only Spring.
- D Double Hinge top and bottom, giving rigid parallel support.
- E Taper Spring Tit, operating 4 Cantilevers F.
- F 4 Cantilevers operating 4 Stone Carriers L.
- G Slotted Extension Nut spanning Cantilevers F.
- H Lock-nut, locking setting of G and J.
- I 4 Full-length Stone Carriers, handling stones as short as 1 inch.
- J Extension Adjustable Lower Spring Tit, operating 4 levers K.
- K Lower Cantilevers, operating 4 Carriers L in conjunction with levers F, thereby holding a rigid parallelism under pressure.
- L Showing Honing Stones in Carriers.
- M 4 Screws in each Carrier pressing against steel strip N.
- N Steel Strip, equalizing pressure of Screws M against Stones L.

NOTE—No. 2 Hone only fitted with lower levers.
No. 1 Hone shorter and more rigid. Fitted with upper set of "F" only.

Parallel Expansion of Stones

The expansion in the Hall Hone is controlled by one spring in the center of hone body. Each stone receives an equal pressure to an equal distance. Each stone is rigidly hinged at top and bottom to prevent tipping or following a tapered cylinder. By soaking stones in kerosene all cuttings remain on the stone in the form of paste and do not drop into the motor bearings.

the seasoned metal is but skin deep—don't waste it

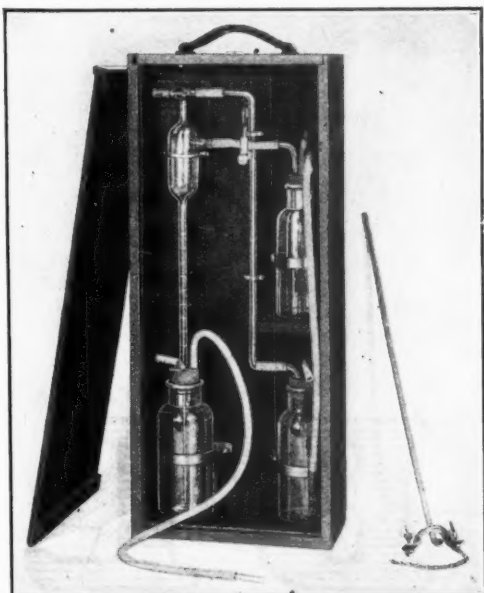
Vast quantities of gasoline are being wasted—

You can show the car owner
how to stop it—and “Cash In”
doing it

You can increase a car's
mileage 25%

Synopsis of Your Market

*Every car owner—
Every truck owner—
Every taxicab owner—
Every fleet owner—
Every business house opera-
ting a truck or light delivery
car.*



There has been developed by the U. S. Bureau of Mines a device that is one of the greatest money makers ever produced for the benefit of the automotive trade.

This device is called the F-J Quick Gas Analyzer.

Its function is to reveal the amount of carbon dioxide gas contained in the exhaust gas which, in turn, shows how to adjust the carburetor for maximum results.

This apparatus has reduced gasoline consumption 20% in some cases and increased mileage to extent of 25% in others.

The F-J Quick Gas Analyzer was developed by the U. S. Bureau of Mines. It was designed by A. C. Fieldner, Supt. and Supervising

Chemist, U. S. Bureau of Mines, and G. W. Jones, Gas Chemist, U. S. Bureau of Mines.

You can make big profits by rendering a special Gas Saving and Mileage Increase Service to every car and truck owner in your territory.

The opportunity is a great one.

The price of the F-J Quick Gas Analyzer is \$37.50. The car dealer, garage man or service station can make a service charge of \$1 to \$2 which will quickly pay for the apparatus. After that—Profit.

But you must know more about this wonderful device. Write for complete details at once.

It is extremely simple—highly efficient—and very profitable to own. Write today without fail.

Burrell Technical Supply Co.
Pittsburgh, Pa.

Jobbers and distributors, there is a liberal discount for you.

F-J QUICK GAS ANALYZER

THEY HAUL
PAPER

THEY HAUL
FRUIT

THEY HAUL
EVERYTHING

THEY HAUL
LUMBER

THEY HAUL
CARPET

“WE now operate forty-eight Republic Trucks, in sizes varying from one ton to two and one-half tons, and we must say that they have given us satisfaction.

THEY HAUL
HARDWARE

“We operate seven other makes of trucks, but none compare with the services we received from Republics. Our oldest Republic has run for seven years, and we have spent less than \$150 on it in the last twelve months. Your service station is all you claim for it, and your organization has treated us right.”

THEY HAUL
STOVES

THEY HAUL
GRAVEL

THEY HAUL
IRON

*Iten Biscuit Company
Omaha, Nebraska*

THEY HAUL
COAL

THEY HAUL
PRODUCE

THEY HAUL
DRY GOODS

THEY HAUL
PIPE

THEY HAUL
GARBAGE

THEY HAUL
MILK

THEY HAUL
MACHINERY

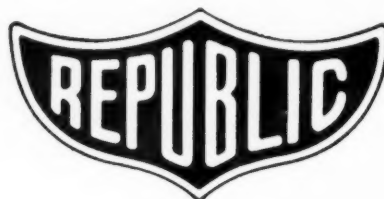
THEY HAUL
TRAILERS

THEY HAUL
OIL

THEY HAUL
BRICK

THEY HAUL
FURNITURE

THEY HAUL
LAUNDRY



REPUBL

THEY HAUL
MERCHANDISETHEY HAUL
FLOURTHEY HAUL
MEATTHEY HAUL
BAGGAGETHEY HAUL
CATTLETHEY HAUL
STONETHEY HAUL
GASOLINETHEY HAUL
POLESTHEY HAUL
PASSENGERSTHEY HAUL
FREIGHTTHEY HAUL
ANYTHINGTHEY HAUL
TEXTILESTHEY HAUL
GROCERIESTHEY HAUL
ALL GOODSTHEY HAUL
MAIL

Tie Up to a Proved Success!

Republics outnumber in actual use any other trucks made by an exclusive truck builder.

This record-breaking volume includes sales made in every field of business using trucks at all, over a range of territory embracing the entire United States and many foreign countries.

This standing was arrived at even before the Improved Republic was introduced. Now Republic reaches the pinnacle of its always remarkable engineering achievement. Engine, axles, brakes, controls, and every other important part, have all undergone expert revision. Republic stands on the threshold of records which will outclass even Republic's past accomplishments.

Republic was, is, and will be a *success!* Further guarantees of this lie in the push and go of the present Republic organization, with its powerful assets of long experience and ample resources.

Hard-headed truck dealers of all persuasions are keeping an eye on Republic. No matter what franchise you have, put Republic data on file. And if you're ready to change lines, why not join forces with a proved success?

REPUBLIC MOTOR TRUCK CO., INC.
ALMA, MICHIGAN

More Trucks in Use than any other Exclusive Truck Builder

IC Trucks



The MINUTE METER

A BARGAIN in clock values and a **BIG** seller in the bargain.

The MINUTE METER sold from the minute we put it out. Dealers all over the country have had phenomenal success. So much so that we have been hard pressed to keep up with the demand.

Dust proof—vibration proof—accurate—accessible for winding and setting—this little dash board time-piece—at the price—can't be beat.

And it is guaranteed by one of the largest manufacturers of this type of movement.

To remove MINUTE METER for setting and winding, just turn a small knob and pull out the clock. It is as easily replaced and it stays put, too.

By all means write your jobber today. If you find that he is out of stock we will ship to you direct and bill him. But put a MINUTE METER on your counter right away. Get your order in at once.

The LUX CLOCK MANUFACTURING CO., INC.
Waterbury - Connecticut - U.S.A.



Our Radium Dial MINUTE METER sells for only \$1.00 more, or \$3.50. Identical in every respect as our Plain Faced Dial except for the Radium for night seeing.

\$2⁵⁰

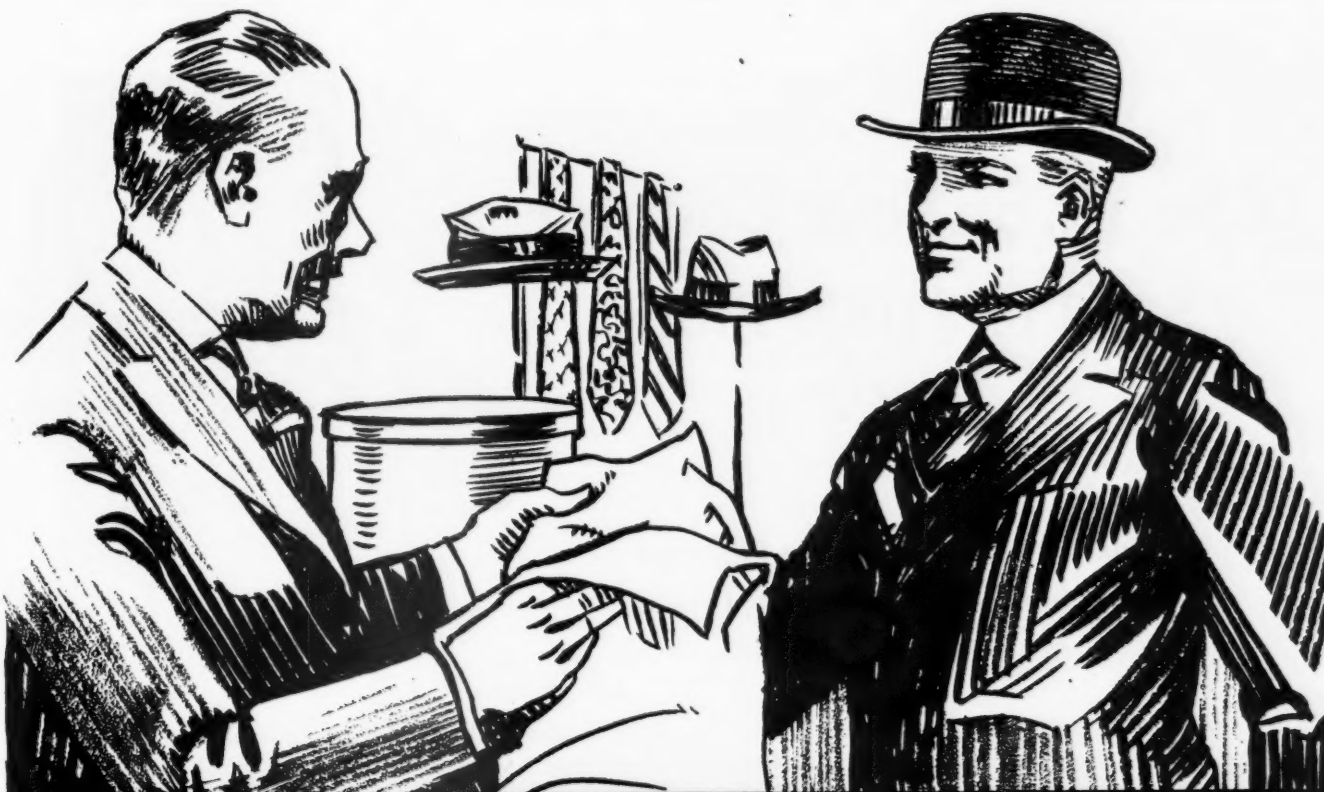
Radium \$3.50



This attractive little counter display stops 'em—and the price settles it. \$2.50. What a bargain!

MINUTE METER is packed in a neat little carton. Use the platform of carton for pattern to cut dash—insert three small bolts and MINUTE METER is on to stay.

Canadian prices: Plain model, \$3.50; Radium Dial, \$4.50.



Sell Service the way they Sell Hats

You know what we mean. The clerk in the haberdashery store isn't satisfied merely to sell you what you ask for. He tries to find out what else you need and sell it to you.

SUGGESTION No. 1—Make compression tests at every opportunity.

Poor or uneven compression means loss of power and excessive gasoline consumption. It may result in crankcase dilution and consequent excessive wear.

ing wear. It may result in burning off valve stems when due to leaky valves, and a broken valve frequently means broken pistons and scored and broken cylinders. It may indicate badly worn cylinders, pistons and rings.

Poor or uneven compression should be attended to without delay. When such a condition exists sell the car owner on letting you correct this bad condition. It will save him money in the long run.

Of course, you must have the best equipment in order to meet competition.

"THE BEST EQUIPPED SHOP GETS THE BUSINESS"

We would like to help you solve your problems, because your problems are what we are in business to solve.

WRITE TO

SERVICE EQUIPMENT ASSOCIATES

TOWSON, MARYLAND

or communicate direct with any of the
SERVICE EQUIPMENT ASSOCIATES
as listed below



Albertson & Co., Inc.
T. R. Almond Mfg. Co.
The Black & Decker Mfg. Co.
Bastian-Blessing Company
Bonney Forge & Tool Works
Brunner Mfg. Co.
Burton-Rogers Company
Continental Sales Corp.
Kellogg Manufacturing Co.
The Manley Manufacturing Company
Frank Mossberg Company
Oxweld Acetylene Company
Stevens & Company
Van Norman Machine Tool Company
Weaver Manufacturing Company
Weidenhoff Products
Wood-Imes Manufacturing Co.
Wright Manufacturing Co.

Sioux City, Iowa
Ashburnham, Mass.
Baltimore, Md.
Chicago, Ill.
Allentown, Pa.
Utica, N. Y.
Boston, Mass.
Columbus, Ind.
Rochester, N. Y.
York, Pa.
Attleboro, Mass.
Newark, N. J.
New York, N. Y.
Springfield, Mass.
Springfield, Ill.
Chicago, Ill.
Minneapolis, Minn.
Lisbon, Ohio



2 Sq. Ft. on Your Counter

\$200 to \$1000 Profit Yearly

How the Alemite Sales Cabinet and Alemite Advertising Triple and Quadruple Sales

How many products that you sell pay \$100 to \$500 net profit yearly for each square foot of space? How much would your yearly income be if every foot of space paid profits at this rate?

Yet, that is what dealers' records from all over the country show that the Alemite cabinet earns. If you care to write we can show you hundreds of letters telling how this cabinet has increased Alemite sales, 100%, 200%, 500% and more. And actually brought in a large volume of other sales too. It will do the same for you.



Alemite Advertising

Every other car owner in your city will see Alemite advertisements every other week and oftener in 1924. In the Saturday Evening Post every other week,

in the leading automobile trade journals every month, in Country Gentleman, Farm Journal and other prominent farm publications, full page Alemite advertisements will appear regularly. You can cash in on this by devoting just 2 sq. ft. of counter space to an Alemite Cabinet. Write today for particulars.

Any Car

With this cabinet and handy manual you can equip any make or model of car with Alemite in a few minutes. It also enables you to furnish replacements (on cars already equipped) of fittings lost or broken. This alone assures you of a nice steady business. Yet your stock of fittings is not large.

Write Today

Any dealer can make good profits on Alemite. But there is a chance to make a real clean-up with this cabinet. For it turns your stock 2 to 4 times faster. That means double or quadruple profits on the same investment. Send today for full information on cabinet and dealer sales plan. No obligation. Use the coupon for convenience.

A Bassick-Alemite Product

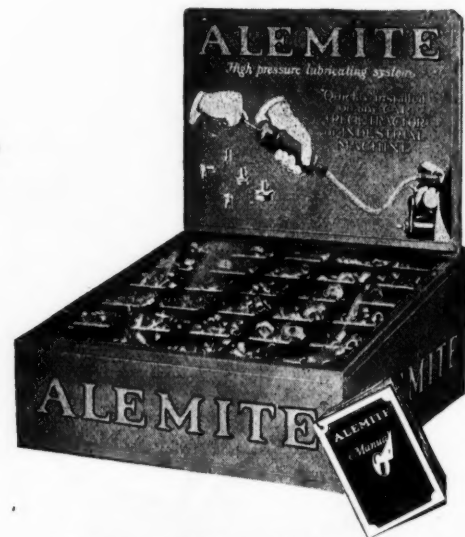
ALEMITE

High pressure lubricating system

The Alemite counter cabinet and the Alemite window sign identify your store with the largest advertising campaign ever run on automotive equipment.

THE BASSICK MANUFACTURING CO.
2662 North Crawford Avenue
Chicago, Illinois

Canadian Factory: Alemite Products Company
of Canada, Ltd., Belleville, Ontario



The new model — Alemite Counter Sales Cabinet (and manual) actual size 16½ x 17 inches.

Send It Today

The Bassick Manufacturing Co.
2662 North Crawford Avenue
Chicago, Illinois

Without any obligation on my part, please send me complete information regarding the Alemite line and the Alemite Sales Cabinet.

I sell..... (Name of cars)..... cars

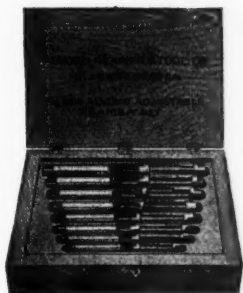
I operate (check which)

☐ Filling Station ☐ Garage
☐ Lubricating Station ☐ Accessory Store

Name.....

Street.....

City..... State.....



Special Ford Sets

Set 15A shown, contains eight reamers with expansion ranges from 15/32" to 1 1/16". Sold separately or in sets.

Stock the Alvord Line

Special Reamers for all cars, trucks and tractors

Reamer Sets for Fords and Fordsons

Adjustable and Expansion Type Reamers

Hand and Taper Pin Reamers

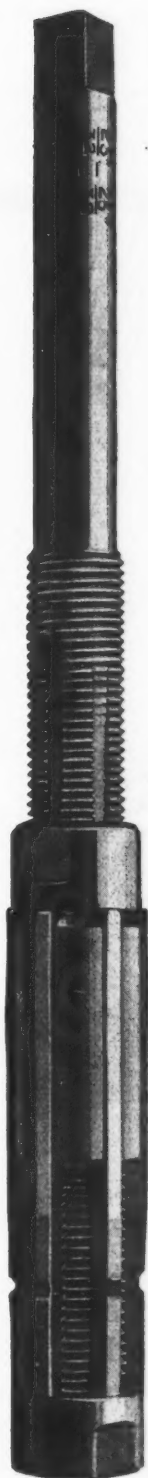
Valve seat and valve stem reamers

Screw Plate Sets. Hand Taps

Adjustable Dies. Cylinder Reboring Tools

Twist Drills, Milling Cutters

Chisels, Punches and Nail Sets.



Good tools provide an incentive to good work. Good work costs less in the end as do good tools. Give your mechanics the equipment they like to work with. Stock the ALVORD line — the tools mechanics indorse.

Alvord Critchley Type Adjustable Reamers

Your tool equipment is incomplete if you haven't stocked Alvord Adjustable Reamers. The blades have a shear cutting action that does not catch in the oil grooves and insures fast cutting of clean, smooth, accurate holes thru the elimination of chatter. They do not require frequent regrinding as the high quality steel used in their making, holds its cutting edge almost indefinitely.

Made in 17 sizes with expansion of first size ranging from 15/32" to 17/32" and from 3 1/2" to 4 1/16" in largest size.

ALVORD ADJUSTABLE PISTON PIN BUSHING REAMER WITH PILOT

This reamer has a pilot stem both front and rear which is ground to an accurate sliding fit to the accompanying taper plug. Very simple to operate, the taper on the plug being very slight but sufficient to securely align reamer in place. It can be used for any size hole which the tool will ream. This reamer is made in all sizes. Our No. 503 set consisting of 4 reamers, will take care of most popular cars.

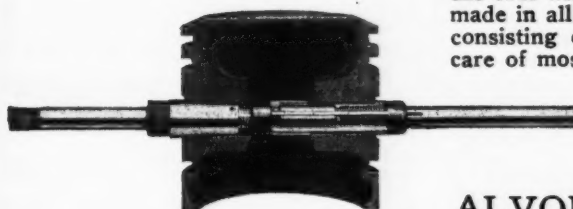


Illustration shows use of reamer with pilot and taper bushing for correctly fitting piston pins.

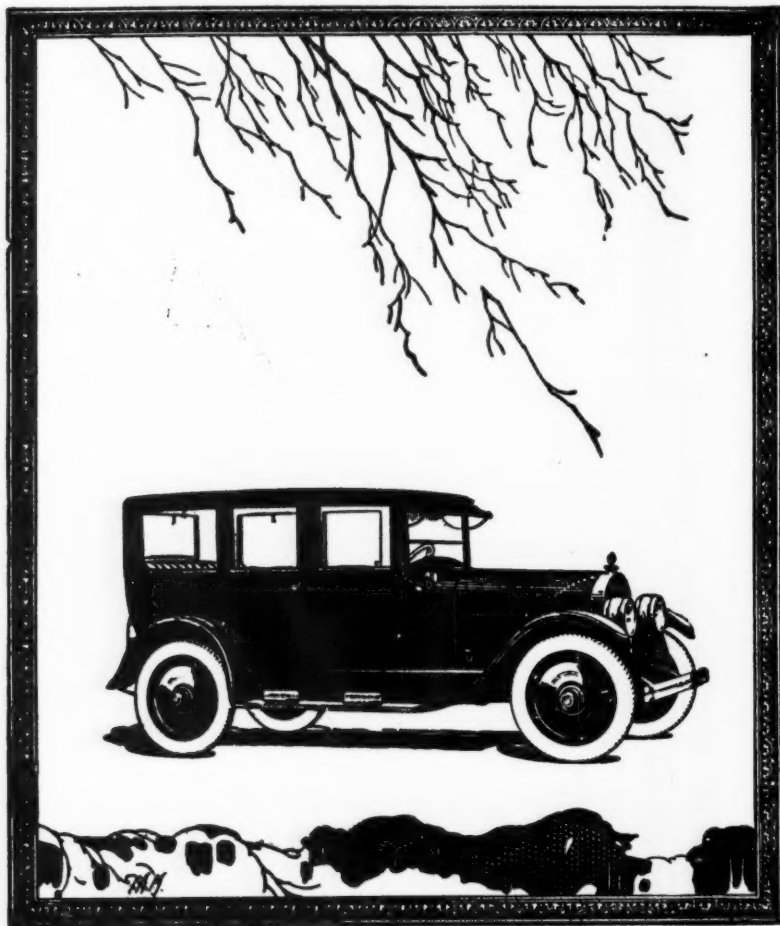
Write for our NEW CATALOG on the Alvord line of quality tools.

ALVORD REAMER & TOOL COMPANY

Millersburg, Pa.

ALVORD TOOLS

"The Tools Mechanics Indorse"



TWO big factories are now producing the FLINT SIX in volume. Territory has been allotted slowly and carefully, because all FLINT SIX merchandisers represent a high type, and because the builders of the FLINT SIX have made certain that FLINT merchandisers have not been "starved" for cars to create dealer expansion. This is just one phase of the Fair FLINT Franchise. If your territory is open, write for a copy of The Flint Success.



Flint Motor Company
Flint, Mich.

SIX

Flint Motor Division
Locomobile Co. of America, Inc.
Long Island City, N. Y.

CROSLEY

THE LARGEST MANUFACTURER OF RADIO RECEIVERS IN THE WORLD

The SIGNAL FIRE of TODAY

PIONEERS of the old west were amazed to see how quickly the Indians learned of their presence.

The advance of a wagon train was known days ahead. Even a lone trader was known long before he arrived in the Indian camp.

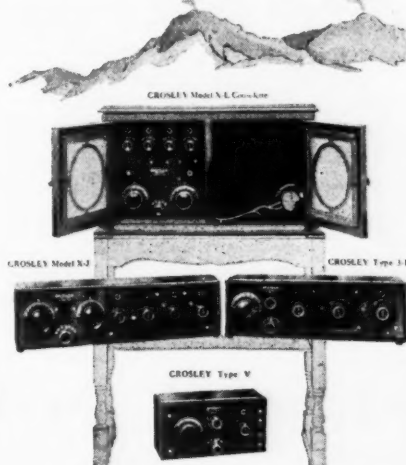
Eventually the pioneers learned that the savages had a highly perfected signal code. From mountain top the signal fire blazed its message at night, or by day sent up its smoke in columns, wreaths, puffs—white smoke, black smoke—it carried a story far and wide.

Gone are the signal fires. Scattered are the tribes. Today the Westerner in remotest places receives his message by Radio—the Modern Signal Fire.

The Crosley Radio Corporation represents
the finest Radio Engineering in the World



CROSLEY
Better—Cost Less
Radio Products



A CROSLEY RECEIVER FOR EVERYONE

CROSLEY TYPE V PRICE \$10.00

A one tube regenerative set, licensed under the Armstrong U. S. Patent No. 1,111,348. Great performance of this radio receiver being given a revolution in the radio world. The 100% efficiency has been proven by the fact that it is the most efficient as well as the most reliable and offers the best price.

CROSLEY TYPE J-B PRICE \$12.00

This 1 tube regenerative receiver licensed under Armstrong U. S. Patent No. 1,111,348. Contains the Crosley Type V and the Crosley tone arm amplifier. In the hands of amateurs and professionals alike it has consistently outperformed sets costing a great deal more. A vacuum bearing 100% efficiency, it is the most efficient and the most reliable set ever offered to the public.

CROSLEY MODEL N-L PRICE \$15.00

A two tube regenerative set, licensed under the Armstrong U. S. Patent No. 1,111,348. Contains a detector and two stages of Audio Frequency Amplification. As brought in, it is the most efficient and the most reliable set ever offered to the public. It is the most efficient and the most reliable set ever offered to the public.

CROSLEY MODEL N-J PRICE \$18.00

A duplicate of the Model N-L except for the arrangement and mounting into a beautiful mahogany cabinet with the addition of a built-in loud speaker. This is the most efficient and the most reliable set ever offered to the public. It is the most efficient and the most reliable set ever offered to the public.

Write for Complete Catalog which fully describes the Crosley line of regenerative and radio frequency receivers and parts.

THE CROSLEY RADIO CORPORATION
POWEL CROSLEY, JR., President

The Precision Equipment Company and Crosley Manufacturing Company
380 ALFRED STREET CINCINNATI, OHIO
—The Largest Manufacturer of Radio Receivers in the World—

MAIL THIS COUPON TODAY

The Crosley Radio Corporation,
380 Alfred St., Cincinnati, O.
Gentlemen—Please mail me free of charge your complete catalog of
Crosley instruments and parts.

Name _____
Address _____

Take your choice—but be sure it's a Crosley

That's the message that is going to millions of prospective radio purchasers each month in the attractive manner depicted in the illustration. So complete is the Crosley Line of receivers and parts, including both regenerative and radio frequency sets, that every one of your customers will find just the instrument to suit his wants and pocket book. And because of the proven worth of Cros-

ley Radio Receivers and the wide publicity given them, the Crosley Line will draw an ever-increasing number of purchasers to your store.

Be alive to the opportunity for increased business that Crosley Instruments offer.

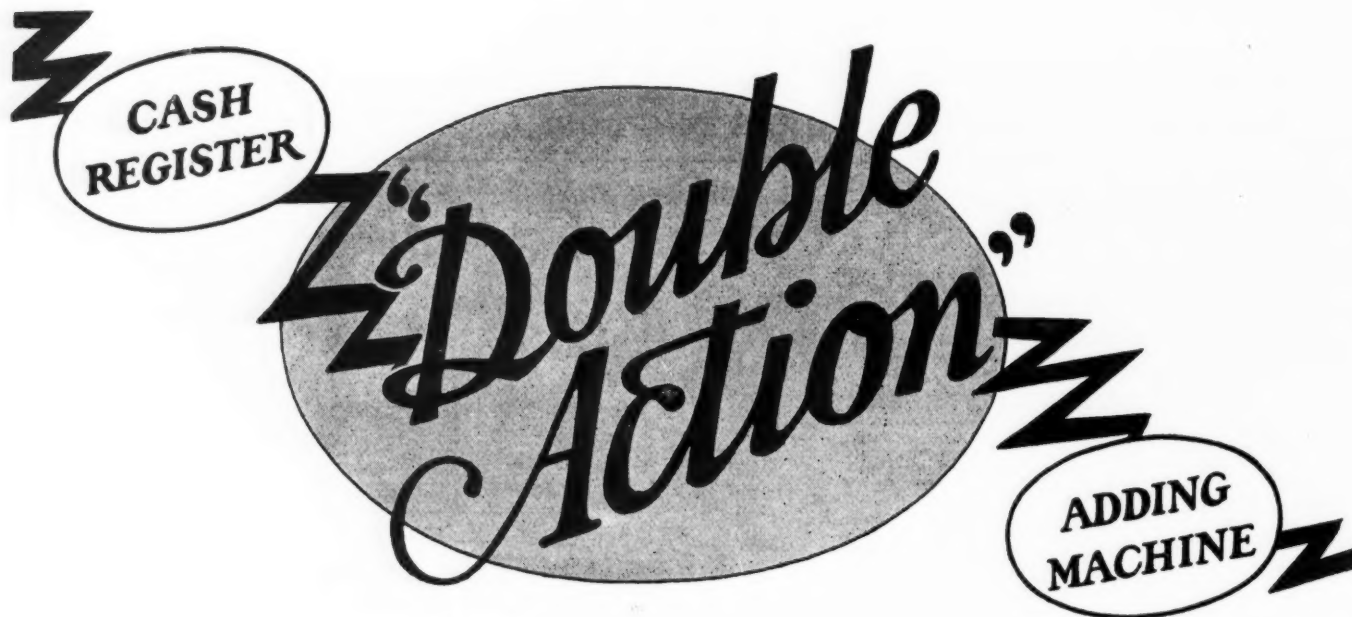
Write Today for Complete Catalog and the name of the nearest Crosley Jobber.

THE CROSLEY RADIO CORPORATION

POWEL CROSLEY, JR., PRESIDENT
Formerly

THE PRECISION EQUIPMENT COMPANY AND CROSLEY MANUFACTURING COMPANY
2534 Alfred Street

Cincinnati, Ohio



Meet rising retail costs with better cash protection

An authority once said, "It takes 15 years to make a business man. It takes 5 years to know goods and clerks, 5 years to know overhead costs, 5 years to recognize profit and stand up for it."

Today, merchandising is even more difficult. Rents, salaries, advertising and other expenses are high. Prices are constantly changing. Competition is keener than ever. Unless selling prices are based upon exact facts and figures, there is almost sure to be loss and disappointment.

The Sundstrand Combination Cash Register is designed especially for present conditions—

gives you a simple, easy way of getting the facts and figures you need to meet rising costs and protect your profits.

The Sundstrand is a "Double Action" machine—is two machines in one—cash register and adding machine. It offers complete cash register protection, *plus* adding machine convenience, in *one* machine at *one* low cost.

Write for full details. Address Dept. M

SUNDSTRAND ADDING MACHINE CO.
Rockford, Ill., U. S. A.

Sundstrand
Adds— COMBINATION —Multiplies
CASH REGISTER
Forced Indication—Automatic Control

Gentlemen: Please send us details and low price of the Sundstrand Combination Cash Register.

Name.....

Address.....

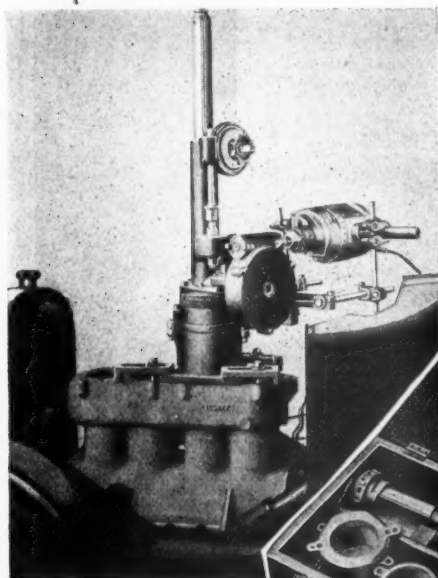
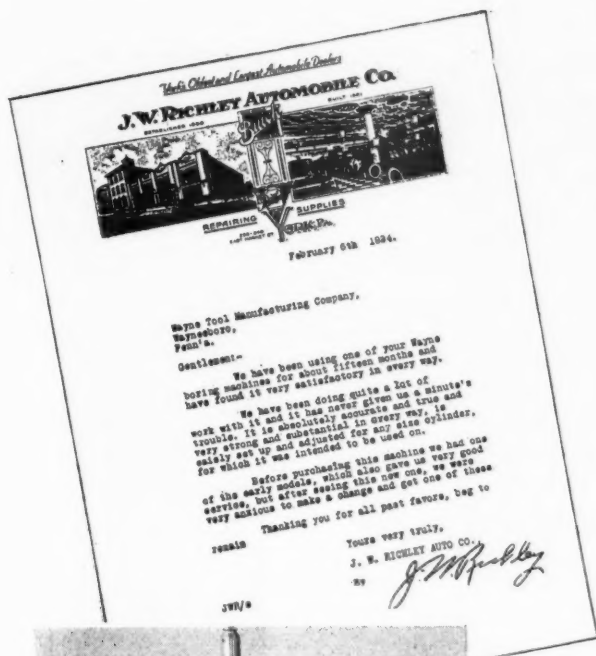
Kind of business.....



THE SUNDSTRAND CREDIT FILE is an added feature—offers a safer, simpler, easier and better way to handle credit accounts. Completes a fully rounded out "business protection" service in a single compact unit. Capacity 2700 sales slips.

Time Saving—

*that's what makes
your profit!*



Above illustration shows the application of the Wayne. Each machine is packed in a heavy oak case with complete instructions for use, as illustrated.



Eliminate the time you lose in removing cylinder blocks for reboring.

That's where your profits leak out on this class of work. The Wayne Portable Cylinder Reboring Machine can handle 95% of your cylinder reboring jobs without removing the blocks. It has the mechanical features of a high grade stationary boring machine with the added advantage of being portable.

It bores absolutely square to the face of the block. The cutter will not follow the bore of a cylinder that is out of line.

Handles any cylinders from 2½" to 5 1/16" diameter. Can be driven by hand, small motor or electric drill.

You can give accurate estimates on reboring jobs with this machine. Many testimonial letters from users bear out our statement that it is profit making equipment.

Investigate the possibilities of increased profits on cylinder reboring jobs in your shop. Write for descriptive circular.

We also manufacture high grade reamers, valve reseating tools, bearing mandrels and valve facing tools.

Wayne Tool Mfg. Co.
Waynesboro, Pa.

WAYNE

Cylinder Reboring Machine

The Tale That The Shadow Tells

—Bolt Threads Produced in
New Way Have Accuracy of .0005"



If you would know the accuracy of bolt threads, let the comparator project their image on the chart, greatly magnified.

Then the truth will come out.

The Empire New Process Bolt has a thread accuracy of .0005"—as smooth and clean as a glazed surface.

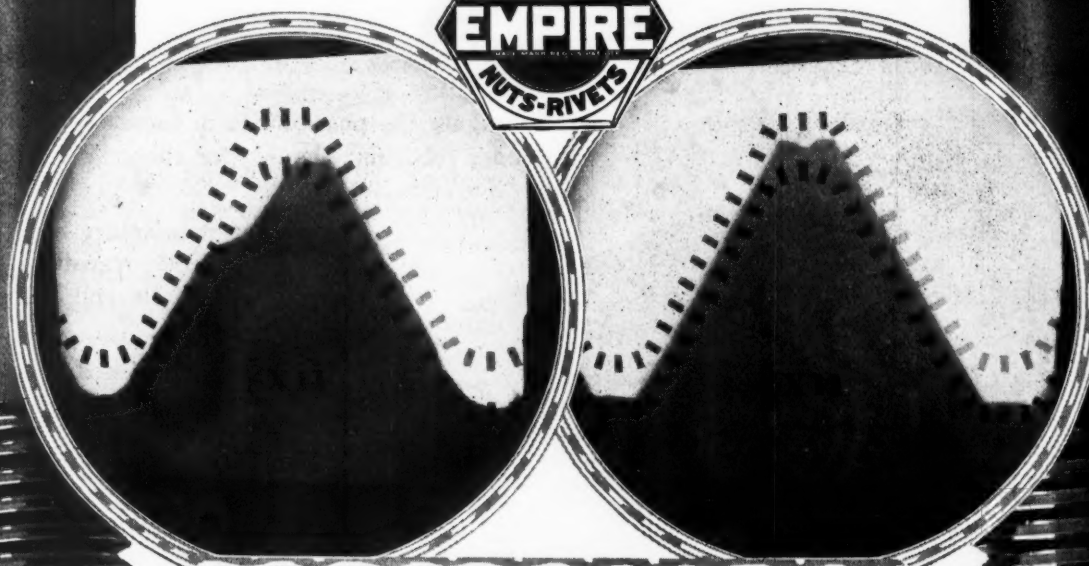
It possesses almost unbelievable strength—the nut is not made that can strip its threads.

A special addition to the factory has been erected and equipped to produce the New Process Bolt.

Samples are available now, for testing and comparing. Sent upon request.

At Left: Ordinary thread
— Below: Comparator photograph.

At right: Empire New-
Process Thread—Below:
Comparator photograph.



RUSSELL, BURDSALL & WARD
◎ **BOLT & NUT COMPANY** ◎

PORT CHESTER, N.Y.

FEMMERWICK, CONN.

CHICAGO

SAN FRANCISCO

ROCKFALL, ILL.

Makers of Bolts, Nuts and Rivets Since 1845

EMPIRE *New Process* BOLTS

Under Normal Production 24 Manufacturers Who Have Adopted Lockheed Brakes, Will Make 250,000 Cars in 1924

Two facts about Lockheed Hydraulic 4-wheel Brakes are intensely significant to the automotive trade.

One is the fact that 24 manufacturers have adopted Lockheed Hydraulic Brakes. During the year 1924, these manufacturers, under normal production, will turn out at least 250,000 cars.

The second highly important fact is the instant capture of public approval by Lockheed Brakes.

Owners of Lockheed-equipped cars are so enthusiastic that the story of the remarkable efficiency of these brakes has spread with amazing rapidity and in ever widening circles.

The car manufacturer who adopts Lockheed Hydraulic Brakes—

1. Immediately frees his organization from costly experimentation, possible patent suits, and uncertainty of results.

2. Adds a powerful selling factor to his car.

3. Simplifies his production, and his service.

4. Affords his car owners what engineers recognize as the most efficient braking system for motor cars.

Lockheed Hydraulic 4-Wheel Brakes are being advertised nationally, by the Hydraulic Brake Company and by car makers.

They are the only 4-Wheel Brakes which possess a clear-cut entity. Those cars which adopt them are immediately strengthened in sales by the fact that 24 other manufacturers, and thousands of owners, pronounced them by far the best 4-wheel brakes made today.

HYDRAULIC BRAKE COMPANY
5835 RUSSELL ST. DETROIT, MICH.

LOCKHEED

Hydraulic Four Wheel Brakes

GATES HOSE

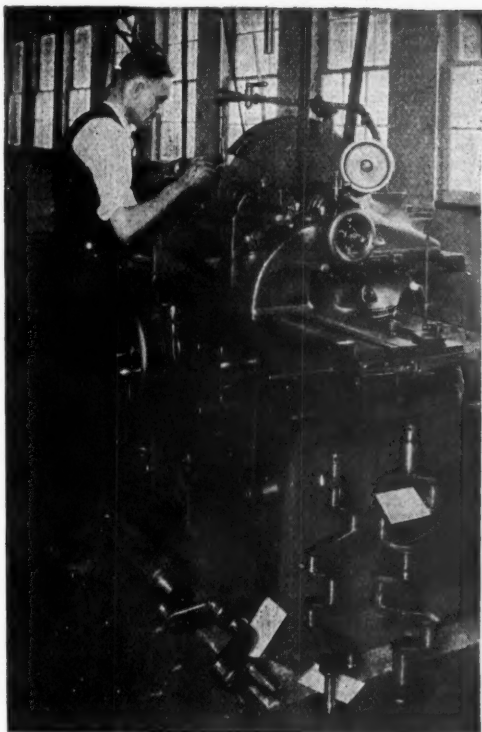
"The Standardized Radiator Hose"



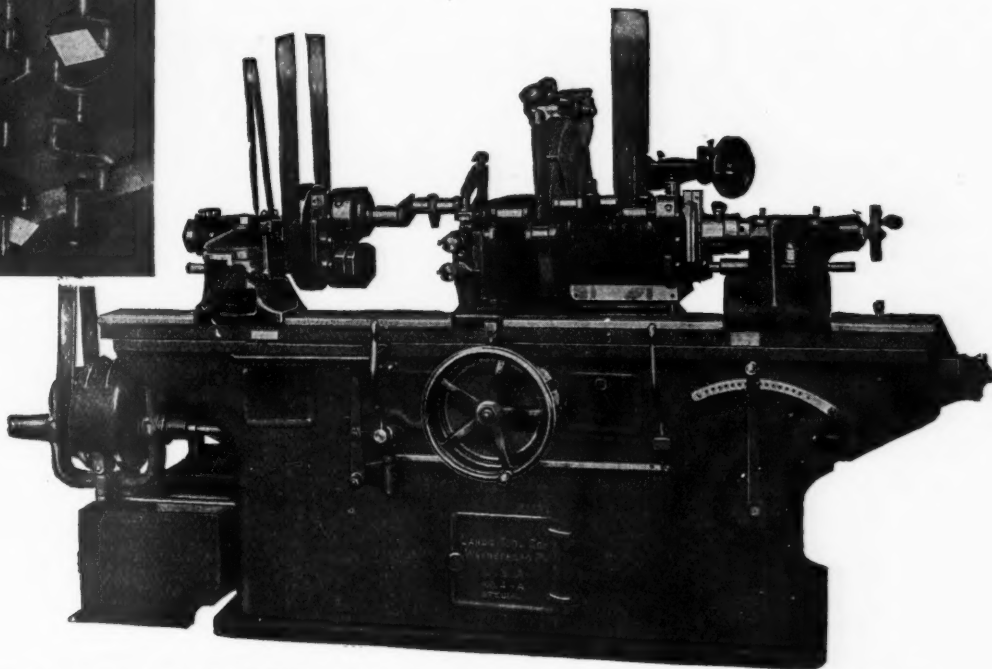
Marked by Inches
Easily Cut to Length

It pays to protect good customers by selling them the radiator hose with the tougher rubber lining—that's why 90,000 dealers recommend Gates Vulco.

Made by the World's Largest
Manufacturers of Fan Belts.



When You Choose that General-Purpose Garage Grinder—



It will be well to keep in mind the difference between your service station and a manufacturing plant. Most of grinding machines on the market are MANUFACTURING machines. They were designed and built especially for the conditions that are found in the modern high-speed specialized manufacturing plant. The conditions in your repair shop are very different—so should the grinding machine you buy be different.

What you should look for—is SIMPLICITY, so that any garage-trained mechanic can operate it successfully. You should look for QUICK CHANGE from one kind of a job to another. You know how it is—a crankshaft now, pistons later, tomorrow some steering spindle bolts or shackle bolts.

The Landis 4-A Grinding Machine is built

especially for automobile repair work. It is equipped with typical Landis conveniences that mean so much in a repair shop. For example—

Crankshafts are gripped in 3-jaw chucks at both ends—and supported by special steady rests close up to the bearing being reground. Result—no distortion, all bearings parallel.

Pistons ground from semi-finished castings are sure to have walls of equal thickness all around. The Landis Piston Holding Fixture assures this—also makes chucking a piston a matter of seconds.

No. 4-A is the ideal garage grinding machine for anything up to crankshafts. And sold at a PRICE.

Quotations gladly furnished.

LANDIS

LANDIS TOOL CO., WAYNESBORO, PA.

New York Office — 30 Church St.

Watch It Grow



A Chain-Store Idea

It sometimes happens that one store in a chain-store system will find itself in possession of certain merchandise that doesn't sell.

But we are told that often when the same goods are sent to another of the chain-stores, located in another city, they are quickly disposed of.

It seems that people's tastes differ in different parts of the country and that often merchandise which is a loss in one place, sells like hot cakes somewhere else.

'Have you any merchandise that won't sell?

Advertise it for sale in the Spotlight Section of this paper. It may be just what some other dealer wants. Only six cents a word. Try it.

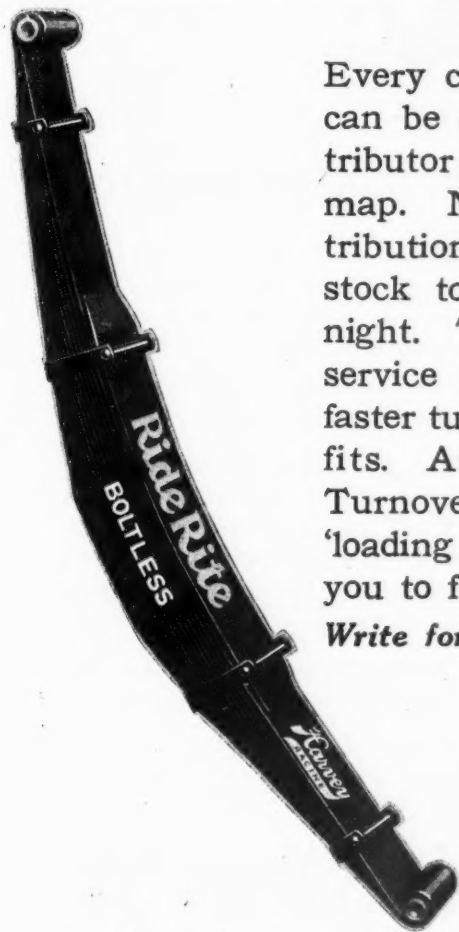
Consult the Spotlight Department
Advertise in the Spotlight Department
Watch the Spotlight Department Grow

The
SPOTLIGHT
DEPARTMENT
THE CLASS JOURNAL COMPANY

Motor World, Motor Age, Automotive Industries,
Motor Transport, Distribution and Warehousing,
El Automovil Americano



Harvey Service is *Nation Wide!* It's easy to supply the Demand



Every conceivable spring demand can be supplied by a Harvey Distributor — quickly. Look at the map. Notice the convenient distribution points. You can get new stock to fill unusual orders overnight. That means you give better service with less stock — you get faster turnover, bigger, quicker profits. Another thing, the Harvey Turnover Plan works to prevent 'loading your shelves'. It will pay you to find out about this feature.

Write for full information. Dept. F.

(Correct Spring Design)
(Shock-absorbing qualities built in)
attains its highest development
in Harvey RIDE-RITE Springs

The Distributors listed in this advertisement stock Harvey guaranteed "Easy Riding" and "Ride Rite" Springs.

HARVEY DISTRIBUTORS

ALABAMA
Loeb Hdwe. Co., Montgomery.

ARIZONA
Allison Spring Co., Phoenix.

ARKANSAS
O. D. Tucker IV & Co., Little Rock.

CALIFORNIA
Waterhouse & Lester Co., Los Angeles.
Waterhouse & Lester Co., San Francisco.

COLORADO
M. L. Foss, Denver.
Motor Accessory & Tire Co., Pueblo.

CONNECTICUT
C. S. Mersick & Co., New Haven.

FLORIDA
Baird Hdwe. Co., Gainesville.
Torbert Tire & Acc. Co., Miami.

GEORGIA
King Hdwe. Co., Atlanta.
H. C. Tennent Supply Co., Augusta.

ILLINOIS
E. C. Kadow & Co., Chicago.

IOWA
J. H. Ebert & Sons, Burlington.
Sioux City Iron Co., Sioux City.

INDIANA
Terre Haute Heavy Hdwe. Co., Terre Haute.
Mossman Yarnelle Co., Fort Wayne.
H. M. Bahls Co., Lafayette.

KANSAS
Auto Supply Co., Hutchinson.
Massey Hardware Co., Wichita.

KENTUCKY
Geo. Dehler, Jr. & Co., Louisville.

LOUISIANA
Rapides Auto Co., Alexandria.
Jos. Schwartz Co., New Orleans.

MASSACHUSETTS
Butts & Ordway Co., Boston.

MAINE
James Bailey Co., Portland.

MICHIGAN
Becker Auto Co., Grand Rapids.

MINNESOTA
Williams Hdwe. Co., Minneapolis.

MISSOURI
Bonniwell Calvin Iron Co., Kansas City.
Campbell Iron Co., St. Louis.

MONTANA
Northwestern Auto Supply Co., Billings.

NEBRASKA
Storz Western Auto Supply, Omaha.

NEW JERSEY
Economy Auto Supply Co., Newark.

NEW YORK
Century Auto Parts Co., New York.
Onondaga Auto Supply Co., Syracuse.

NEW MEXICO
J. Korber & Co., Albuquerque.

NORTH CAROLINA
Glasgow-Stewart Co., Charlotte.
Odell Hdwe. Co., Greensboro.
Harris Hdwe. Co., Washington.

NORTH DAKOTA
Grant-Dadey Co., Fargo.

OHIO
Roberts Toledo Auto Co., Toledo.

OKLAHOMA
Severin & Co., Tulsa.
Severin Tire & Supply Co., Okla. City.

PENNSYLVANIA
Berrodin Auto & Supply Co., Phila.
Chas. B. Scott Co., Scranton.

RHODE ISLAND
Goodby Rankin Co., Providence.

SOUTH DAKOTA
L. & L. Motor Supply Co., Sioux Falls.

TENNESSEE
C. M. McClung & Co., Knoxville.
Orgill Bros. & Co., Memphis.
Gray & Dudley Co., Nashville.

TEXAS
Peden Iron & Steel Co., Fort Worth.
Peden Iron & Steel Co., Houston.
Peden Iron & Steel Co., San Antonio.
W. F. Dulaney & Sons, Paris.
Borderland Auto Supply Co., El Paso.

UTAH
Inter Mountain Electric Co., Salt Lake City.
Motor Mercantile Co., Salt Lake City.
Strevell-Patterson Co., Salt Lake City.

VIRGINIA
Barker Jennings Hdwe. Corp., Lynchburg.
Piedmont Hdwe. Co., Danville.
Chas. Leonard Hdwe. Co., Petersburg.
Virginia-Carolina Hdwe. Co., Richmond.

WASHINGTON
Whiton Hdwe. Co., Seattle.
Holley Mason Hdwe. Co., Spokane.

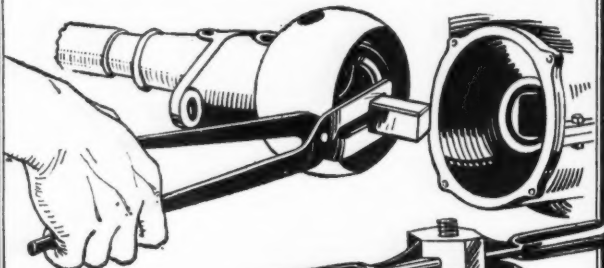
WEST VIRGINIA
Motor Car Supply Co., Charleston.

WISCONSIN
Shadbolt & Boyd Iron Co., Milwaukee.
Clemons Auto Supply Co., Eau Claire.
Wiedenbeck, Dobelin Co., Madison.

CANADA
J. H. Ashdown Hdwe. Co., Ltd.
Winnipeg
Saskatoon
Calgary
Edmonton

Harvey Spring & Forging Co., Racine, Wis.

Don't Neglect Your Rear Axle Work



HOW often the Ford Rear Axle Assembly needs overhauling! Most shops however, would rather duck that job . . . too difficult—takes too much time—customer won't pay the price. But you'll be hunting for axle jobs when you are armed with Stevens Speed-Up Group "A." The mean, time-consuming operations in axle work—the overhauling of the Ford Drive Shaft—become automatic in speed and accuracy with the ten special Stevens Speed-up Tools in Group "A."

It's a snap to replace the Drive Shaft Sleeve with Stevens Puller and Driver—just as easy to replace and fit the Drive Shaft Bushing, with Stevens Bushing Extractor, Driver, Reaming Jig, Reamer and Refacer—nothing to the pulling of the Pinion or Transmission Drive Gear with Stevens Duplex Gear Puller—and see how easy the Universal Joint is slipped in with Stevens Tongs while the Giant Punch expels and inserts the Knuckle Pin in an instant.

Tackle your Rear Axle work with confidence and profit—get this chest of ten special Stevens Speed-Up Tools today.

STEVENS & COMPANY
375 Broadway, New York

"Thru your Jobber—his service is economy"

Your cost, \$34.00, Complete. Each cent it costs on the job means an extra dollar of profit for you.

Write for Catalog
241-MA — showing
our 100 tools

Stevens

**100
Special
Tools
for
FORD**

SPEED UP Tools



The gyrating yokes of the Cyclone Hoist keep $\frac{2}{3}$ of all gear teeth in contact to carry the load. View shows only the foremost yoke. The rear yoke (not shown) is engaging an equal number of teeth on the lower side of the lift wheel.

—carry the load on more teeth!

WE show above a cutaway view of a portion of the lifting mechanism so that you can see at a glance how the gyrating yoke of a Cyclone Hoist means a safer, stronger hoist, and minimizes vibration and wear.

The gyrating yoke is a patented engineering improvement found in no other hoist but the Cyclone. *Its peculiar gyrating motion keeps two thirds of the drive and lift gear teeth in contact at all times.*

You'll get faster, smoother, easier lifts and longer service from a Cyclone.

Distributors Everywhere. Send for catalog covering 1 to 40 Ton Hoists, Cranes, Trolleys, and Overhead Track Systems.

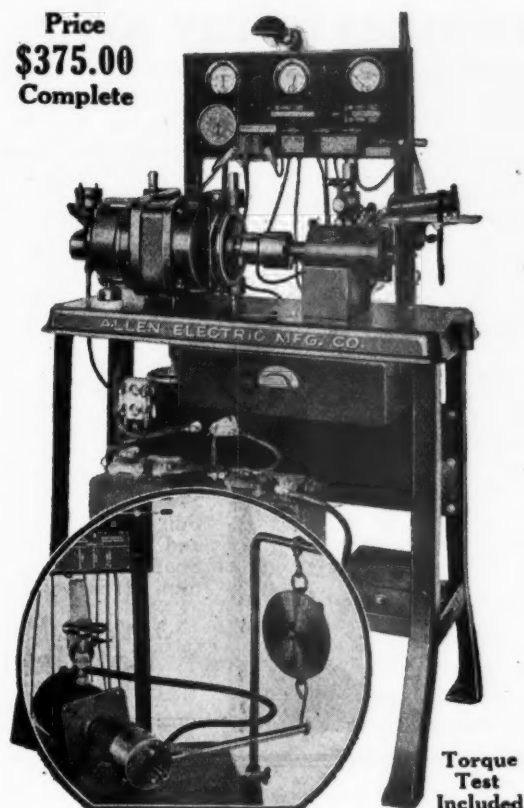
The Chisholm-Moore Mfg. Co.
Cleveland, O.

Branches: New York, Chicago, Pittsburgh

Hoists Cranes Trolleys
Overhead Track Systems

ALLEN UNIVERSAL TEST STAND

Price
\$375.00
Complete



Torque
Test
Included

Profitable Spring Business

Dealers who can handle the business will make a big profit this spring. More cars will be serviced this year than ever before. Allen Universal Test Stand, an absolutely complete testing unit, not only will do thousands of dollars worth of profitable work but will win you the best type of customers. Many new features make this superior test stand a necessity to any well-equipped shop.

Ask your jobber or write to us for complete details. Catalog on request.

ALLEN ELECTRIC MFG. CO.
2204 W. Fort St. DETROIT, MICH.



"MECHANICS" Oil Lubricated Universal Joint

Mechanics Oil Lubricated Universal Joints **replace**; they are **not** replaced.

So when you install one, you can say, with confidence, that there will be no more universal joint trouble on that car.

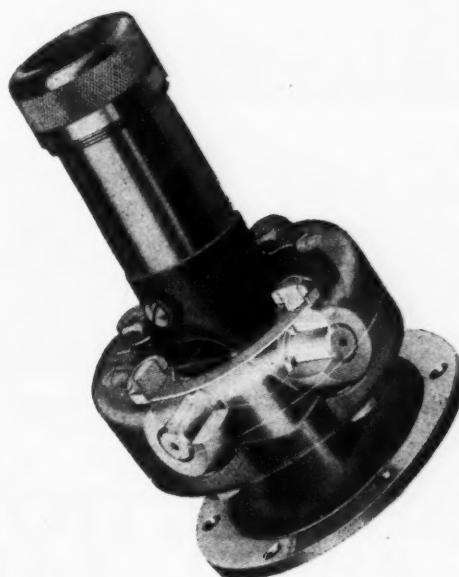
Lubrication once or twice a year keeps the Mechanics Joint working as long as the car runs. Oil is used, because oil lubricates long after grease has lost its lubricating qualities — and you know the answer to an ungreased universal.

There is a handsome profit, of course.

Address the Service Dept.

Mechanics Machine Co.

Rockford, Ill.



STOP LOOK LISTEN!

*More Sales—
more profit!*

With twelve sizes of "Perfection" Pedal Pads, you can equip any car made during this and the past SEVEN YEARS. This means small stock—quicker turnover—bigger profits.

Our complete line consists of Extension Pedals, Accelerator Extensions, and special pads for every make of car—

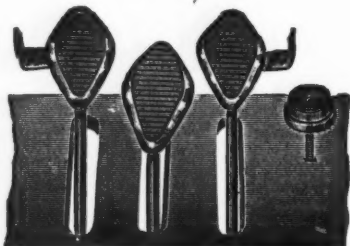
But 12 sizes will carry you a long way. No bolts—no drilling—just bend the prongs and "Perfection" Pads are on to stay.

We have a special proposition to offer on quantity orders. Better send for our catalog and discounts.

AUTO PEDAL PAD CO.,

318-320 West 52nd St.,

New York City



The New "D" Hook for Ford Cars

Provides a comfortable rest for the foot and relieves muscle tension. Attaches without bolt or drilling—just bend the prongs. A great convenience and a rapid seller in a big market. \$1.00 per set.

This Display Board, Accelerator and Starter Pads, 12 assorted sizes, \$6.00

These pads are made in sizes to fit accelerator or starter for every make of car. Strong, well designed, heavy rubber pads set in a nickel frame. Makes control of the throttle easier and more certain. Price, 50c. each.



"Perfection" Pedal Pads are known throughout the Trade. Satisfaction guaranteed to Dealers and Car Owners

"PERFECTION" PEDAL PADS

INSIST ON THE PAD WITH THE NICKEL FRAME

Service Rim Tool

5 minutes to any job



Price
Now
Only
\$12.00
f. o. b.
Elkhart

A 100% Perfect Tire Changing Tool Sold with a Money Back Guarantee

ADJUSTABLE, case-hardened, corrugated grips clamped on rim by wing nut, which absolutely cannot slip, bend, kink or harm the rim. ABSOLUTE ASSURANCE of being able to handle any rim, even the worst battered and bent ones.

ADJUSTABLE to all makes and sizes of demountable split rims. SIMPLICITY of operation coupled with strength and lasting durability. Send for your service rim tool. It is waiting.

Service Mfg.
Co., Elkhart,
Indiana.

Selling trucks and buses is easier when you know the owner's viewpoint

Read *Motor Transport*.

It tells you the problems of the Fleet Owner. It tells you how Fleet Owners are making and can make a success of truck or bus operation.

Just as *Motor Age* tells you how to handle your business, so *Motor Transport* tells how to efficiently operate fleets of motor trucks and buses. Reading *Motor Transport* will make you a better dealer.

Recommend fleet owners to whom you have sold trucks or buses to subscribe for *Motor Transport*. This magazine will make them more efficient operators.

You will both benefit!

Motor Transport is published semi-monthly, on the 1st and 15th. The subscription price is \$2.00 per year (\$2.50 West of the Mississippi).

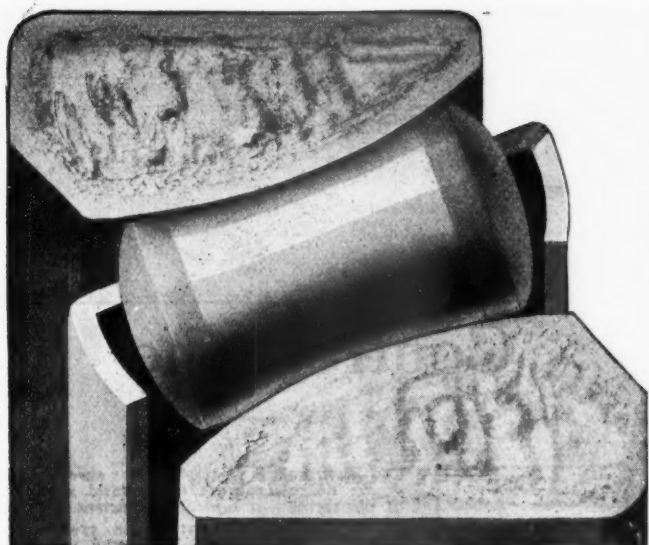
Write for a sample copy.

Motor Transport

FORMERLY COMMERCIAL VEHICLE

(Published by the Class Journal Co.)

239 West 39th St. New York, N. Y.



SHAFA

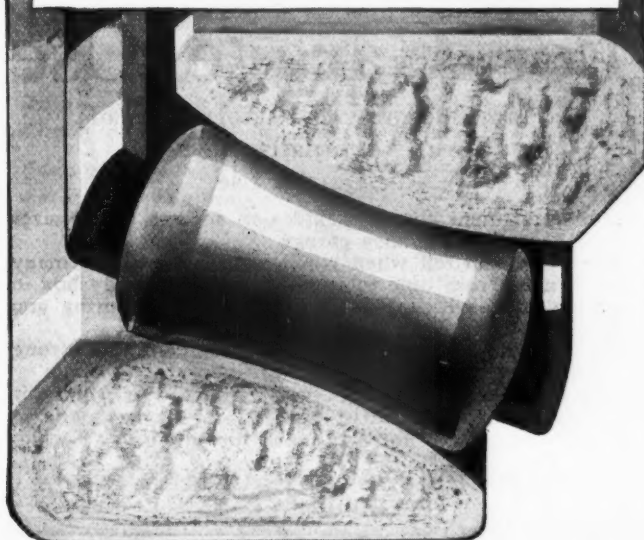
Self-Aligning ROLLER BEARING

PAT. & PATS. PENDING

There is a Shafer Bearing interchangeable with practically any size of cup and cone front wheel ball bearing, including front wheel ball bearings now used in the Buick, Oldsmobile, Oakland, and Chevrolet. They are guaranteed to fit and render satisfactory service.

Our new service catalogue is now ready for Distribution.

SHAFA BEARING CORPORATION
6501 WEST GRAND AVENUE
CHICAGO, ILL.



MANZEL

HYDRAULIC SHOCK ABSORBERS



Become A "Manzel" Distributor— It Pays

Dealers and distributors everywhere who sell "Manzel" Hydraulic Shock Absorbers make good profits and a long list of satisfied customers.

The reasons are many. Unlike the conventional type of rebound absorber, "Manzel" Hydraulic Shock Absorbers retain their original efficiency throughout the life of the car, with no mechanical breakdown or wear from the ceaseless hammering on the car springs.

And they bring an entirely new conception of car riding. Automatically proportioning their action to the size and severity of the bump, they ease the springs down so gently that the road shocks are scarcely felt.

Every road is smoothed out—and all this without the slightest effect on the operating efficiency of the "Manzel", because the work is done by automatically controlled oil and not by springs or mechanical action.

"Manzel" Shock Absorbers offer a proposition of genuine interest and profit. Though considered by motorists everywhere the most efficient instruments yet produced for reducing shocks, they sell at a far lower price than any other high grade shock absorber and therefore have a broader market.

They are adjustable to any weight of car. Their installation is simple and they will give efficient service for a life time.

If you are interested in a money-making, customer-satisfying proposition, why not look into the advantages of having the "Manzel" agency in your town. Write for details anyway.

Manzel Brothers Company

306 Babcock Street

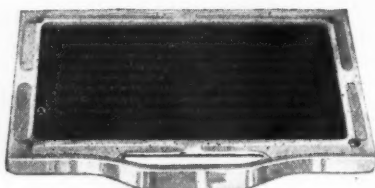
BUFFALO

NEW YORK

New! Step Plates



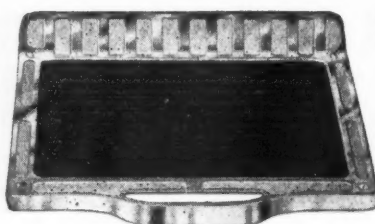
A High-Grade



Low
Priced

Line of

Pure Cast
Aluminum

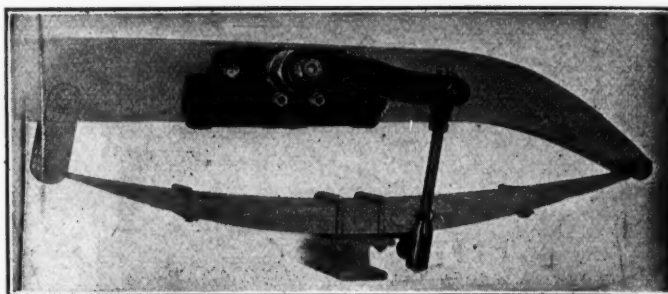


Step Plates



Samples and Prices Upon Request

THE OHIO PARTS CO.,
3305 Colerain Ave., Cincinnati, O.



Controls the Springs—

A double-headed piston, within a cylinder, working both ways against a body of oil. A smooth even pressure that absorbs all shocks.

The hydraulic principle of absorbing shocks doesn't prevent the natural action of the springs—it controls the action.

A 10-pound jolt is met by an opposing force of 10 pounds. A 200-pound jolt is met by an opposing force of 200 pounds. This principle permits smooth, velvety spring action—natural but controlled.

2-Way Hydraulic Shock Absorbers are easy to install—have an unusual service record—are an extremely fine proposition for live dealers.

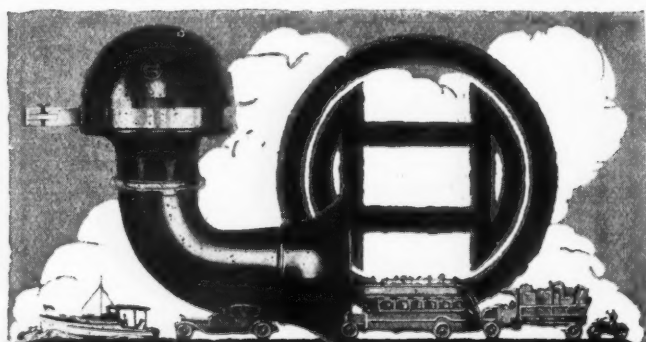
Write for full details.

Auto Spring Control Co.

Jamestown,

New York

2WAY
HYDRAULIC
SHOCK
ABSORBERS



Bosch
Two Tone Horn

There was a 330% increase in sales on Robert Bosch Horns in a few months.

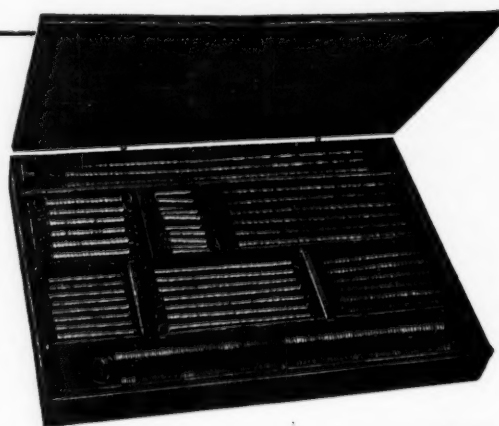
Secure details of this valuable Selling Franchise at once.

Robert Bosch Magneto Co., Inc.

OTTO HEINS, President

109 West 64th Street, New York

Chicago Branch: 1302 South Wabash Ave.
Service Stations in Principal Cities the World Over.
The Genuine, Original Bosch means Robert Bosch only.



For Garage Use

Peck's Improved Assortment of
Springs especially selected
for Garage Use

This assortment contains extension springs of the sizes most needed in the busy garage.

You never can tell when you'll want one or how many you'll need from time to time. With this handy box in stock you'll save time and money. Just the spring you need always on hand.

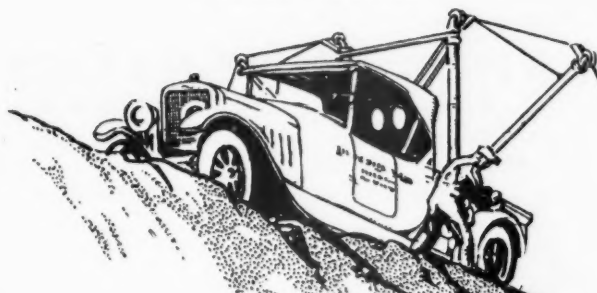
The price of this handy assortment complete in a strong wooden box is only \$5.00.

You can secure it through your jobber. Ask him for Peck's Spring Assortment No. 2A. If he has none in stock—write direct and we'll send him the bill.

THE PECK SPRING COMPANY
PLAINVILLE, CONN.

HOLMES AUTO WRECKER

No. 485



A job in the shop is worth two by the roadside—but you can have all three.

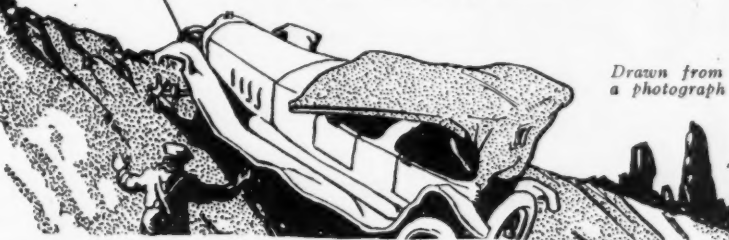
Just Let Them Know You Own One

Drive around town a couple of days with a wreck. The way it goes around corners and down hill will convince every motorist that you have the equipment to get him out of trouble without additional damage—quickly and inexpensively.

After that you'll get calls aplenty. Each will be worth many dollars—some for towing, more for the after-repairs. Figure on profits from \$200 to \$500 a month.

Your jobber will tell you about it.

Ernest Holmes Co.
Chattanooga, Tenn.



*Drawn from
a photograph*



SAFETY Front Wheel Brakes

Can be attached to ANY MAKE of car. Wonderful overhaul opportunity as every motorist wants to be up-to-date. Operates from the regular brake-pedal. Permits any car to stop in less than **HALF THE DISTANCE** required with rear wheel brakes alone. Safety feature appeals to all—especially women-drivers. Absolutely no danger of skidding.

Don't pass this up. It is one of the biggest money-making opportunities you will have this year. Write us NOW about this. Big discounts.

GREEN ENGINEERING COMPANY

740 MAIN ST., DAYTON, O.

Distributors for Front Wheel Brakes only. H. F. Morgan, Tampa, Fla.; Reid Air Spring Sales Co., Pittsburgh, Pa.; Clarion Buick Co., Clarion, Pa.; Kittanning Buick Co., Kittanning, Pa.; F. L. Wirick, San

Pedro, Cal.; Walker Auto Supply Co., New Kensington, Pa.; John J. Schiffmacher, Brooklyn, N. Y.; John B. Messey, New York City; McCarthy Bros., Inc., Philadelphia, Pa.

G-H TENSION RINGS

Similar in design to other inner rings but made of the highest grade of steel obtainable so tempered that they will retain their original tension and not only make but *keep* an old motor running and sounding like new.

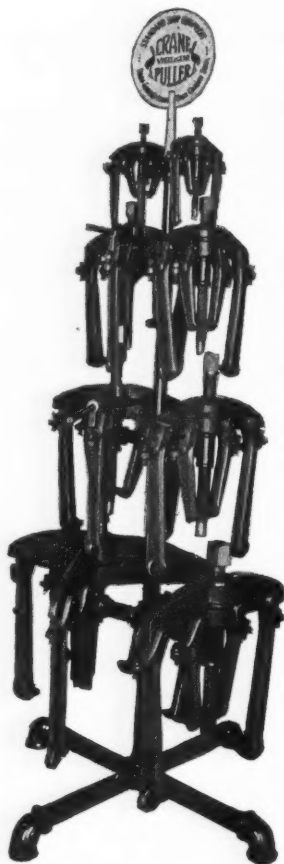
Reboring is an expensive proposition. You can give your customers the same results by using G-H Tension Rings. Slap is eliminated, oil pumping is stopped—Power, speed, silence are restored. Gas and oil consumption is cut.

Profit is yours—satisfaction is assured. The work is easy. One size fits 90% of all cars. Retail Price, 20c. each. Specify width when ordering G-H Tension Rings.

Dealers—G-H Tension Rings are solving the used car proposition for dealers in all parts of the country.

G-H Tension Ring Co.,
Armory Place & Howard St.,
Baltimore, Md.

They Stop Piston Slap and Oil Pumping



Helps you pick the right puller

Greatest aid to picking out a Wheel or Gear Puller ever devised. On one stand, at one time, you see them ALL—and can pick the RIGHT one for your particular work. Two-arm and crowfoot pullers, four sizes of each. Look for the Crane Puller rack at your jobber's. It will PAY you.

JOBBER: Greatest aid to wheel-puller sales ever. It is doubling and tripling sales in some places. Don't fail to get one—FREE.



Crane Puller Co.
Arlington, Mass.



NO REBORING

is Necessary With

GENUINE APEX INNERINGS (INSIDE PISTON RINGS)

Garagemen, mechanics and carowners have found no device so successful to

STOP PISTON SLAP AND OIL PUMPING

excessive carbon, vibration, fouled plugs and to renew power, silence and flexibility. Best of all there follows a marked saving in gas and oil.

"Resales" can be quickly and economically repowered to greatly increased value.

RETAIL PRICE

20c

each up to 3/4" wide or 5" diam. Larger 35c. Insist on our Guarantee Tag. If Dealer does not stock them, write us.

No Cutting or Fitting

to add expense to the job. Genuine Apex Innerings come ready cut and shaped in all standard and "over" sizes.

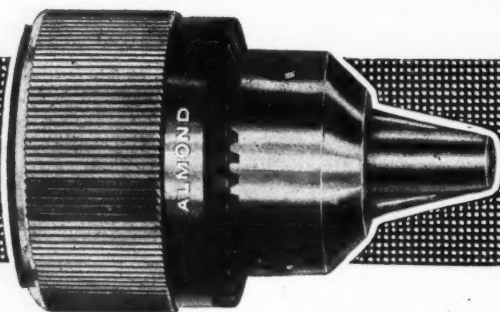
Dealers—Jobbers

Write us now. Others are getting big sales and a quick turnover.

THOMSON MFG. CO.

PEORIA Dept. C ILLINOIS
(Successors to Thomson-Friedlob Mfg. Co.)

Almond "Straight Line" Chucks



ITS DISTINCTIVE APPEARANCE IS YOUR SAFEGUARD

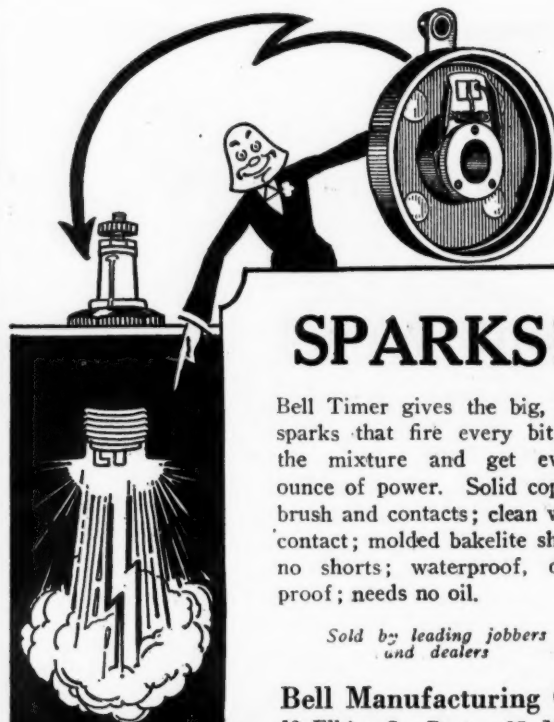
When you buy a portable electric drill, look for the "Straight Line" milling which assures you that the chuck is a GENUINE ALMOND.

When you buy replacement chucks for your drilling machines, insist upon "Straight Line" chucks.

ALMOND chucks and policies are "Straight Line" throughout.

T. R. ALMOND MFG. CO.

Ashburnham, Mass., U. S. A.
Established 1873



SPARKS!

Bell Timer gives the big, hot sparks that fire every bit of the mixture and get every ounce of power. Solid copper brush and contacts; clean wipe contact; molded bakelite shell; no shorts; waterproof, dirt-proof; needs no oil.

Sold by leading jobbers and dealers

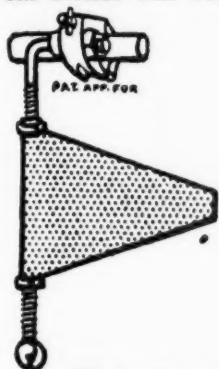
Bell Manufacturing Co.
13 Elkins St., Boston 27, Mass.

The BELL TIMER



SELL THIS PRACTICAL DEVICE WITH A QUICK TURNOVER

The Brinkman Pennant Glare Screen is a big seller because it meets a long-felt want. It protects drivers from the glare of approaching headlights and makes night-driving a pleasure. Every motor-car owner will want one. Better stock it now and be prepared.

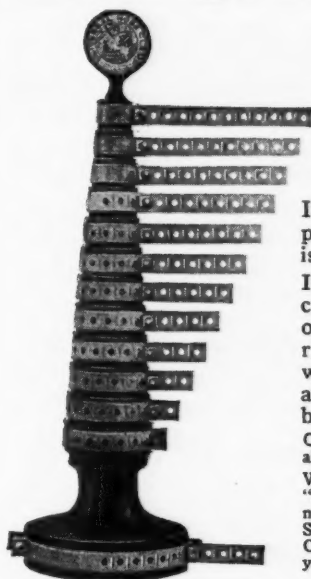


The Brinkman Pennant Glare Screen is made in two types to fit any open or closed car. Strongly constructed of aluminum and brass; no glass. It is highly endorsed by state highway officials.

This device is being nationally advertised and you are sure to have requests for it. There is a liberal profit for you and a quick turnover.

Write for attractive Dealer proposition
MIQUON SALES CORPORATION
Dept. 56, Lancaster, Pa.

Its Edge Is Smooth—



© 1922

The Universal Hose Clamp has a smooth edge—no metal parts project to catch in the fingers—it cannot cut or injure the hose—it is Electro-Galvanized, not heat galvanized—the clamp, bolt and nut cannot rust.

Its patented "bead" creates a pressure so tight that a leak is impossible.

Its scores between holes cause a clean, quick break-off. It is made from steel ribbons—cold rolled from wire. It is a quality clamp—always has been—always will be.

One size 1 to 3 inches is adjustable to fit any hose of any size. We also make a clamp called "Junior" to satisfy occasional needs of hose 1/4" to 1 1/2 inches. Specify the Genuine Universal Clamp—known to the trade for years—used by the trade for years.

Universal Industrial Corp.
Hackensack, N. J.

Patents Granted
March 20, 1917
March 1, 1921

UNIVERSAL HOSE CLAMP

Adjustable to fit any hose of any size

Sure-footed as a Mountain Goat—

That's the kind of brake lining you want to sell—isn't it? The purchaser has no comeback when you sell Testbestos Brake Lining—he has no cause for one. Testbestos takes a bull-dog grip instantly under the most unusual conditions.

Made from extra long asbestos fibres, interwoven in strong brass mesh and well treated.

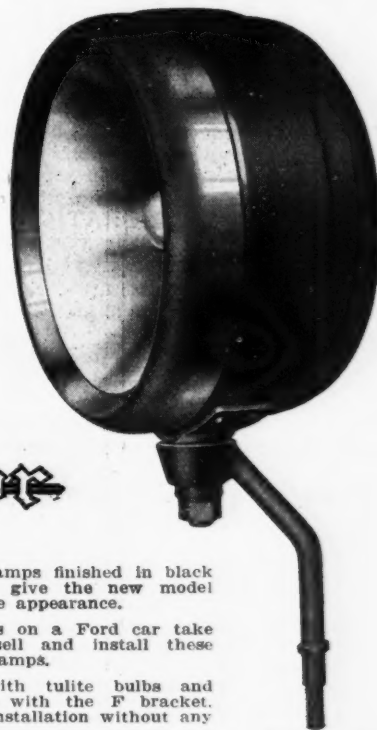
Ask for the name of the
nearest Testbestos Jobber

American Asbestos Co.
Norristown, Pa.

REG. U.S. PAT. OFF.
TESTBESTOS
AUTOMOBILE
BRAKE LINING

Tested and Guaranteed!

Tone up
both new
and used
Ford Cars
with the
No. 740-F
Drum Type
Headlamps



These popular style lamps finished in black or black and nickel, give the new model Ford cars a distinctive appearance.

When replacing lamps on a Ford car take the opportunity to sell and install these attractive drum type lamps.

We furnish them with tulite bulbs and prismatic lenses—also with the F bracket, ready for immediate installation without any change in wiring.

This No. 740-F is consistent with Victor quality, and has a rapid turnover, which means profit to you.

The F-type
bracket fits
all Ford Cars

THE CINCINNATI VICTOR CO.
714 Reading Road, Cincinnati, Ohio

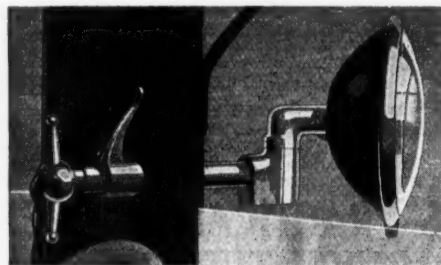
MORE PROFITS--SATISFIED CUSTOMERS

You, and every other dealer, jobber or repairman, want more profits, and more steady customers — the kind that always come to you. Boyle Valves will bring you both. Tell your customers what these valves will do and the sales will take care of themselves.

BOYLE Never Grind VALVE

Boyle Never-Grind, Silent Valves run from 50,000 to 100,000 miles without grinding, operate silently, and are guaranteed. Those are some of the points that make them fast sellers. Write for further particulars, and for our profitable distribution plan.

BOYLE VALVE CO., 2101 LARRABEE ST., CHICAGO



Big Profit!
PFAFF
Spotlight
Inner Control
\$10.00

Big profit because frequent and easy profit, as well as because of wide margin on every sale. Looks like \$50.00 worth. Stays put when the windshield is moved. Easily installed. Requires only one 3/4" hole in corner post. Light can be turned straight rear for backing up. Get a stock and make some good money quick. No kicks or service. Write right now.

PFAFF MFG. CO.

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Chicago

Every Ford Owner Needs This Wrench In His Tool Kit

When spark plugs are rusted in, it takes a good wrench to remove them. We will guarantee our 3620 to do this trick.



The 3620 can be used on cylinder head bolts and will get the two under the dash. You can use it on water connections and other parts.

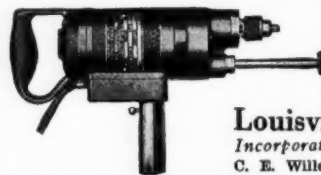
Show this number 3620 to every Ford owner, it will make sales, show you a good profit and be a fast seller.

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Incorporated
WORCESTER, MASSACHUSETTS



Get This "Pioneer"
\$65 Garage Special

Electric Drill
and Valve Grinder



Greatest time and money saver, as well as money maker, for your shop—

"It Will Do The Work"

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Incorporated
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C. E. Willey, Pres. J. B. McFerran, Secy.-Treas.

KESS High Speed Valve Grinder

Positively Grinds valves in 1/4 usual time and guarantees a better job. Can be operated at 4,000 r.p.m. Fits any electric drill or hand drill. Absolutely **NO VIBRATION**. Weighs 8 ounces. Easily reaches rear cylinder of Fords. Price \$5. Get details from us or from any electric drill manufacturer.



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809 Harrison Bldg.
Philadelphia, Pa.

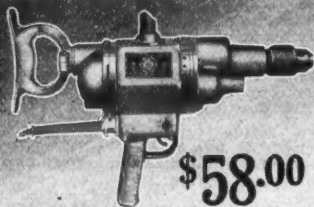
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Ball Bearings



BLACK & DECKER

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"With the Pistol Grip and Trigger Switch"

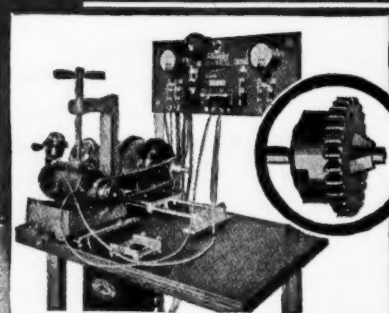


\$58.00

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With the Positive Drive and Speed Control



INCREASE YOUR PROFITS!
Starting, lighting and ignition pays bigger profits than any other branch of automotive service.

The Excelsior Test Bench

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Payable \$50 per month
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TRADE MARK

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Angular Contact Radial Bearings and Angular Contact Thrust Bearings. Manufacturers of Thrust Ball Bearings for all sizes and types of machines. Standard sizes of Thrust Ball Bearings and Special Thrust Ball Bearings.

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"Triple-Tested" Never Beated"

DISSECTION OR SURGERY?

The difference between ordinary automobile lamps and Anchor Auto Bulbs is the difference between a gross dissection and a surgical operation.

The difficulties of dissection are quickly mastered by anybody, but even the most casual operation on a live patient calls for special skill.

There are twenty-one operations in making Anchor Bulbs, many of them as delicate as brain surgery. They call for trained minds and steady nerves.

This skill, moreover, is subject to impersonal, scientific inspection all along the line. Finally the whole bulb is triple-tested by a special process.

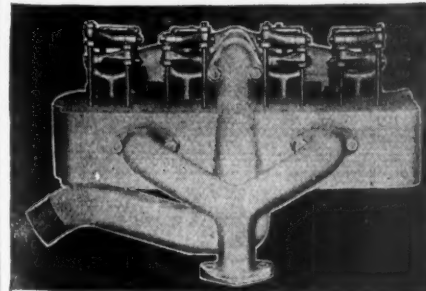
Such are the exacting demands to maintain Anchor quality. And Anchors cost no more than ordinary lamps. Less, if anything.

Shrewd buyers know all this and every time will pick:

ANCHOR AUTO BULBS
Triple-tested, Never Beated"

Anchor Electric Company, 555 Jackson Blvd., Chicago, Ill.

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For Ford and Dodge Motors
ROOF 8 VALVE HEAD FOR FORD MOTOR



Stupendous Power—Lightning Speed

Ford racing cars with Roof Equipment are rivals on mile and one half mile tracks of the highest priced racing cars. Doubles the pulling power of the Ford or Dodge pleasure car or truck. Hill climbing and general road work beyond wildest dreams of the owner. Complete — ready for installation — no machine work necessary. We are headquarters for all speed equipment. No matter what you want, write us. Racing quality — lowest prices. A postal card brings you complete list of our specialties.

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THE LAUREL MOTORS CORPORATION, ANDERSON, INDIANA

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TO FORGET THEIR CHAIN TROUBLES

HELP YOURSELF
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By Installing Only

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HIGH MILEAGE CHAINS
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ALL THE NAME IMPLIES
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STEERING KNUCKLE BOLTS AND BUSHINGS
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HEAT-SHAPED
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CYLINDER HEAD GASKETS

Heat-proof Gas-proof Can't blow out Retain their life
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One for every standard make of car, truck and tractor.

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\$50
110 VOLT

PETERSEN
Guaranteed HALF INCH
ELECTRIC DRILL

So powerful that the combined strength of three men could not "stall" it when drilling 1/2" holes in steel. Write for miniature catalog describing the complete line of Petersen Portable Electric Tools.

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The Most Air Per Dollar Cost

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Regular, Oversize, Orphan
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The Custom Built Car

The Aristocrats of Motordom

7 Models—Open and Closed

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COMPRESSORS

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FEDERAL BUMPERS

They look like part of the car, not like accessories. Beautiful in design—rugged. Ask for Catalog No. 11.

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STUTZ Speedway Four

America's Pre-eminent Sport Car

STUTZ MOTOR CAR COMPANY of AMERICA, Inc., Indianapolis, Ind.
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Bumpers for all Cars

The Price and Quality Satisfy

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Kokomo Long Life tires and tubes make money for dealers who handle them.
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EVERYDAY PISTON RINGS
Interlocking joint eliminates all filing, fitting and joint leakage.
Priced to be profitable to dealer and jobber.

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A high grade step cut at a low price; lathe turned individually gauged.

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\$17.50 COLONIAL CYLINDER HONES \$17.50
PRICES REDUCED ONE HALF

You can now buy the Colonial Cylinder Hone, an approved tool for this class of work and one of the best Hones on the market at \$17.50 each F. O. B. Kalamazoo. Made in three sizes, one, two and three, No. 1 2 3/4" to 3 1/4", No. 2 3 1/4" to 3 3/4" bore, No. 3 3 3/4" to 4 1/4".

Colonial Cylinder Hones are now being used by some of the best factory Service Stations in the country as well as by numerous Service Station Owners.

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IT'S EASY TO SELL
"The only oil ring with a mileage guarantee"
"Sav-Oil" is stamped on bottom of every ring

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AN AUTOMOTIVE NECESSITY THAT SELLS
LORENTZEN HEADLIGHT KONTROL, INC.
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JOHNSON No. 8
Adjustable Torch



Will melt 25 lbs. of soft metal, heat soldering coppers, preheat any metal parts, or the burner can be adjusted to any angle or removed entirely and used as a hand torch for pre-heating, burning paint, etc.

Write for complete catalog.

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Make the Big Money in Spring Overhaul Jobs

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Stormizing Machines
Will handle all your cylinder renewing. Will add a big profit to your spring shop jobs. Look into this better method of cylinder refinishing. Send today for our book: Modern Cylinder Methods.

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New Bolts and nuts, laminated shims, bronze wrist pin bushings, are part of the rod rebuilding at no extra charge.

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TOLEDO Standardized VALVES

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Valves Exclusively for 1924 Models

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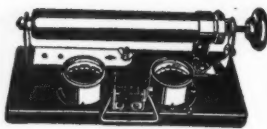
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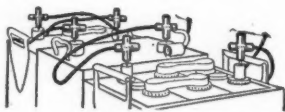
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A tap with a hammer anchors them into battery terminal—like a nail in a block of wood. Positive metal-to-metal contact. Built to last for years.

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\$5

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Is as reliable as the Ford Car itself and assures a positive cooling system that constantly functions. No more overheating—No more freezing in travel—Made engineeringly correct of best materials—quickly and easily installed. Write for Dealer Discounts and complete information.

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**"In Stock -
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Write Milwaukee Die Casting Co., Milwaukee, Wis., for name of one of our 500 distributors nearest you.

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For Jobbers and Distributors

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Relio, an electric-drive wet grinder for pistons, pins, valves, bushings, \$475.00. Valvo, an electric-drive bench grinder for valves, valve-seat reamers \$175. See page ads this paper.

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THREE PRODUCTS YOU NEED

ZIP FRICTION PASTE, for fitting in bearings.
ZIP GRINDING COMPOUND, for valves.

ZIP LAPPING COMPOUND, for lapping in pistons.

The Original Water Mixed.
U. S. Pat. 1353197

Write For Samples

THE ZIP ABRASIVE COMPANY

Ask Your Jobber.

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Denver, Col.

Barty Parts Make a Better Axle



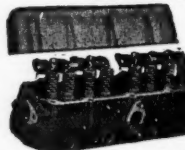
—they act as a differential semi-lock which makes your axle essentially a solid axle on straightaways and allows the differential to function at the turns. Simple, easily installed. Get the details.

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The remarkable showing of the Fronty-Ford in the 500-Mile Race at Indianapolis May 30 was due solely to the performance of the Frontenac Cylinder Head. This Head is adapted for use on your Ford car by its designer and builder, Arthur Chevrolet. Write for FREE Catalog. Book, "How to Build a Fronty-Ford," \$2.00; free with orders of \$50.00 or more.

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"The Signal
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GARDNER

Motor Car

Johns-Manville NON-BURN ASBESTOS BRAKE LINING

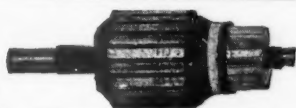
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Turn Down a Rewind Job
Send it to us. We are "Armature
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Profit for you in our service—Ford generator armature rewind—
\$1.95. Other prices in proportion. All work guaranteed. Write
for catalog and prices on all generators.

H. M. FREDERICKS CO.,

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Threaded for 1/2-in. hose. Strongly
supported and counter balanced.
All brass construction.

Electric contact by rotor brush.
Watertight joints—automatic
water control at end of hose.

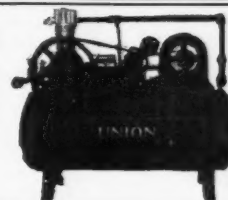


9 ft. swivel permits use of short hose. Light always OVER job. Water controlled
AUTOMATICALLY by LITTLE GIANT WATER SAVER. Lowest priced combina-
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Built For Long Life

In filling tires be sure to get the
details of this Model 150 Union
Air Compressor of 2 cylinders.
Capacity 5 cu. ft. per minute.

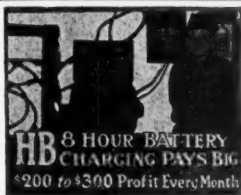
Union Equipment Co.
Butler, Pa.



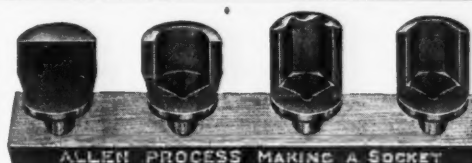
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outfit. Easy terms of only \$20 monthly let
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Cold-
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ALLEN
Wrench
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The Allen Manufacturing Company, Hartford, Conn.

HOESS

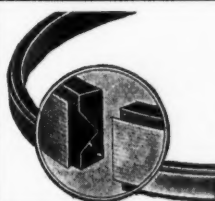
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Combines the simplicity of the one-piece ring
with the snug fit and oil-scraping ability of
more complicated designs. Good profit and
fine results. Write for prices and discounts.

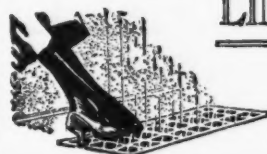
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State & Jessie

Hammond, Ind.



LINENDOLL EXHAUST HEATER



Attractive in appearance, with cleaning
features of removable heating coil with no
connecting joints inside the heater pan to
leak. Meets instant approval. No odor or
noise. Easily installed and operated. Will
boost your winter sales—get our attractive
trade proposition.

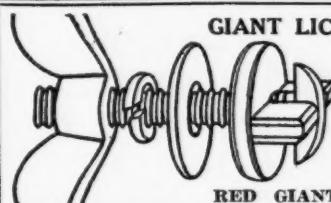
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Norwalk, Ohio

"2-Point-Test" HYDROMETER \$2.50

"Guards
Your
Battery's
Health"

Here at last is a battery tester of very finest quality. It is absolutely guaranteed to
be accurate—every instrument must pass the two-point test. Green ribs of celluloid
make sticking of float impossible. Write for details.
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When you lose a license plate the cost
is from \$2.50 to \$5.00. With Giant
license plate holders you need not fear
losing your license plate as they are
fastened permanently to the holders and
can be installed in one minute's time.
Guaranteed to give perfect satisfaction
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FOLBERTH Automatic WINDSHIELD CLEANER

"It Cleans
While
You Drive"

A good profit for you in this
wonderful, fast-selling necessity.
Ask your jobber or write.

THE FOLBERTH AUTO SPECIALTY CO., CLEVELAND

A MONEY MAKER FOR

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When a car owner sees this piece of equipment he
wants it—he realizes what a great convenience it will
be. This accounts for the record breaking sales now
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Second Spare Tire Carrier and Rim Tool carries sec-
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or removed without tools—tires cannot chafe—con-
tracts and expands rim when changing tires. Only
one size to stock for all cars. Write for details.

TRIPP-SECORD & CO., 606 Kerr Bldg., Detroit



Welco Accelerator for Fords

Easily installed—one hole to drill.
Works independent of throttle. Any
engine speed by setting adjusting nut.
In colored carton complete with in-
structions. Write your Jobber.

Also makers of Welco Step
Plates, Gas Tank Caps, Blanket
Holders, etc.

The Welker-Hoops Mfg. Co., Middletown, Conn.

140 Combinations —all in this ONE set

Everything you need, in one small box, compact,
accessible, and a real mechanic's outfit. Sockets
will not break. Fully guaranteed. Ask your dealer
or write us.

The Eastern Machine Screw Corp.
10-20 Barclay Street, New Haven, Conn.



BATTERY SERVICE EQUIPMENT!

UNITRON
Rectifier

PORTOSTAT
Test Set

FOREST ELECTRIC COMPANY

New and Wilsey Streets

NEWARK, N. J.



PORTER ^{RED-CUT} GLASS



For Ford Replacements

The finest quality hand blown triple strength crystal sheet glass cut to exact size and finished on one edge. Packed in a manner that minimizes breakage. Jobbers and dealers can carry stock with little chance of damage. Write for complete details.

PORTER MIRROR & GLASS CO., Fort Smith, Ark.
Automotive Division—3124 Locust Blvd., St. Louis, Mo.

NO-LEAK-O PISTON RINGS

Won't Leak Because They're Sealed With Oil



No-Leak-O Piston Rings are making money for dealers everywhere. Their "oilSEALing" groove—found only in No-Leak-O—picks an oil film in between piston and cylinder walls like "packing" in a pump. Oil and gas stay where they belong. National advertising is helping the dealer sell No-Leak-O.

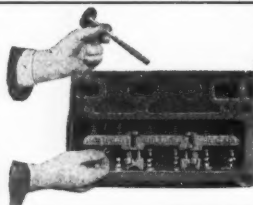
It will pay you to stock No-Leak-O at once.

Price 35c and up

NO-LEAK-O PISTON RING CO., Dept. 376, Muskegon, Mich.

EATON

BUMPERS



SPEED-O

Multiple Valve Lifter

LIFTS 8 TO 12 VALVE SPRINGS
IN LESS THAN 30 SECONDS

Manufactured by

SPEED-O MULTIPLE VALVE LIFTER CORP.
1926 Broadway, New York

QUICK GETAWAY FOR FORDS IN THE COLDEST WEATHER

The flattened design of the Krafve Intake Mixer Manifold spreads out and completely vaporizes the gas. Gives a quick start, easier pick-up, low throttle on direct drive, more speed and mileage. Easy to instal—excellent profit. List \$5.00. Write for proposition.

KRAFVE AUTOMOTIVE CORP.,

Oakham, Mass.

CONNECTICUT

IGNITION



UNIVERSAL

2 rings that cover
every need

Ground or turned finish
Attractive jobber's proposition

UNIVERSAL MACHINE CO.
BALTIMORE, MD.

Dealers
Every
Where

INSIST UPON



The Original

SILENT TIMING GEARS

Made of CELORON

Dalton & Balch, Inc.

2333 Michigan Ave., Chicago

Over a
Million
In Use



Real High Tension Ignition for Ford Cars

Varley Transformers eliminate nearly all chronic ignition trouble. Save gas. Add power. Keep plugs clean. Stop misfiring. Save repairs. \$2.50 each. Write for full particulars.

The Autocoil Co., Jersey City, N. J.

VESTA

STORAGE BATTERY

We can prove to any automobile dealer that there's money in selling Vesta Batteries and there's no "grief." We say we can prove it. Ask us to do it.

Vesta Battery Corporation

Chicago, Ill., U. S. A.



BRAKE LININGS and CLUTCH FACINGS

Always used where safety and service are the first and only consideration.

KELSO M'FG CO.,

TRENTON, N. J.

POWERFUL — SAFE — FAST! "DICKERSON" TURNTABLE JACK

Handles all cars for all kinds of work. Great for spring and chassis repairs. Saves time—makes money for you. Priced RIGHT. Write for catalog.

C. A. DICKERSON
COMPRESSOR CORP.
Buffalo, N. Y.



Meachem

Gear Rings
for Fly Wheels

Quality rings at
lowest prices. Get
our list.

MEACHEM GEAR
CORPORATION
Syracuse, N. Y.

Send Us Your Armature Repair Work

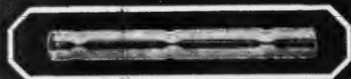
FORD
ARMATURES
REWOUND
\$2.00



MOST ANY
TWO UNIT
GENERATOR
ARMATURE
\$5.00

ALL WORK GUARANTEED—WRITE FOR PRICE LIST
U. S. AUTO SUPPLY CO., 3845-49 S. WABASH AVE., CHICAGO

REQUIRES
ONLY
HEAT



SAMPLE
FREE

DREDNAUT

Equalizers FOR FORDS

AUTO SPECIALTIES MFG. CO., 579 GRAVES ST., ST. JOSEPH, MICH.

The SPOTLIGHT

DEPARTMENT

WILL FIND WHAT YOU WANT



PARTS and REPAIRS

USED AND NEW AUTO PARTS

Special Prices for the
Next 60 Days

We need room. Write us
for anything no matter
how old or late Models.

Sander Bros. Auto
Wrecking Co.

West Point

Iowa

BOSCH MAGNETOS

GENUINE GERMAN BOSCH MAGNETOS, NEW ENCLOSED TYPE

	OUR PRICE	LIST PRICE
ZH 6	\$18.00	\$60.00
ZH 6 (M14)	15.00	60.00
ZR 4 (2 spark single)	30.00	100.00
ZU 4 (2 spark dual)	35.00	100.00

BIG DISCOUNTS ON NEW PARTS.
GEARS—AXLES—SPRINGS—BEARINGS—
PISTON PINS—VALVES—TIMING GEARS.
ALL OUR GOODS CARRY A MONEY
BACK GUARANTEE

CONNECTICUT AUTO PARTS CO., INC.
36-52 Morgan Street, Hartford, Conn.

WRITE US FIRST!

Save Time and Money

We carry a complete line of Automobile Parts
Transmissions (all kinds)

Cylinder Blocks Magnetos (all kinds)
Drive Shafts Carburetors
New Gears (all kinds) Starters
Used Gears (all kinds) Rear Ends

400 Motors of all kinds in stock at all times

WRITE

BENNETT BROS.

Largest Auto Wreckers in the Country
Grant and Water Sts. Pittsburgh, Pa.
Mail Orders Given Prompt Attention

AUTO PARTS

SAVE 50% TO 75% ON ALL CARS

New and Used Gears—Springs and Axles—Cylinders—
Motors—Rear Systems, etc. Wire or Write

INDIANA AUTO PARTS CO.
316-18 NO. ILLINOIS ST., INDIANAPOLIS, IND.
LARGEST CAR WRECKERS IN INDIANA

ANY PART for ANY CAR NEW or USED
Send for Catalogue
Cincinnati Auto Parts
& Wrecking Co.
712-714 Walnut St.
CINCINNATI, OHIO
Parts our middle name

INFORMATION

Six cents a word is the rate for all undisplayed advertisements set solid, regular want ad style; minimum charge \$1 an insertion; payable in advance (see next paragraph).

Ten per cent discount if one payment is made in advance for four or more consecutive insertions. Advertisements other than "Positions Wanted" will be billed monthly if run 3 months or longer.

Add five words for address if replies are to come to a box number address at any of our offices. These replies are forwarded each day as received, in new envelopes, at no extra charge.

Refund will be made if all insertions ordered are not needed, the amount refunded being the difference between cost of insertions given and full amount paid.

Telephone orders must be confirmed in writing same day. No allowance can be made for errors of any kind unless prompt notification is sent us.

In writing to box number advertisements, send your letter to our New York, Detroit or Chicago office, whichever is nearest, to insure quick receipt by the advertiser.

When replying to blind ads be careful to put on your envelope the correct box number and do not enclose original letters of recommendation—send copies.

Displayed advertisements are sold by the inch. Rates will be furnished upon application.

The right is reserved to refuse any advertisement and also to rewrite and edit copy furnished whenever the publisher considers it advisable to do this.

SPOTLIGHT DEPARTMENT THE CLASS JOURNAL COMPANY

5 S. Wabash Ave., Chicago
239 W. 39th St., New York
7338 Woodward Ave., Detroit

PARTS and REPAIRS

Auto Parts!

Anything for an Auto. Save from 50%
to 90%.

Gordon—Auto Salvage
Racine, Wis.

AUTO PARTS

Save 50 - 90%
2000 Model.

NEW AND USED GEARS, AXLES, BEARINGS,
SPRINGS, MAGNETOS, GENERATORS, ETC. JOBBERS IN BANKRUPT AUTO SUPPLIES.

BRIGHTMAN AUTO EXCHANGE

321 Windsor Ave. HARTFORD, CONN.

DOWMETAL PISTONS

Lighter, stronger, and longer wearing than aluminum or iron. Can be fitted with bronze bushings in the wrist pin holes same as in iron pistons. Dowmetal has no permanent growth. The expansion is little more than iron.

SEND FOR PARTICULARS

LAMBERT & MANN CO.
Cylinder and Crankshaft Grinding
215-21 N. Wood St. CHICAGO Phones West 4918

WICHITA AUTO WRECKING CO.

"The Old Reliable"

Offers you quick service, quality parts and absolute satisfaction,—and our prices are a little lower. We are an old reliable house and all that implies. Our stock of parts is one of the largest in the country—from a 1907 one cyl. Reo to a 1921 Overland Four.

Wichita GIVE US YOUR NEXT ORDER Kansas

JANSEN FLY WHEEL GEAR RINGS

None better at any price.
New price list just out.

JANSEN MACHINE COMPANY
Des Moines, Iowa

MAGNETOS and SERVICE STATIONS

SAVE ON THE INITIAL COST OF ELECTRICAL EQUIPMENT

Our new and properly rebuilt electrical equipment is priced to save you money and is guaranteed against any defects. Before purchasing motors, generators and transformers, write for our bulletin A-12. Over 8,000 machines in stock.

THE FUERST-FRIEDMAN COMPANY,
Cleveland, Ohio

PATENTS and PATENT ATTORNEYS

Attorney-at-Law and Solicitor of Patents
C. L. PARKER

Formerly Member Examining Corps., United States Patent Office

American and foreign Patents secured. Searches made to determine patentability and validity. Patent suits conducted. Pamphlet of instruction sent upon request. McGill Building, WASHINGTON, D. C.

PATENTS

BOOKLET FREE HIGHEST REFERENCES
PROMPTNESS ASSURED BEST RESULTS

Send drawing or model for examination
and report as to patentability

WATSON E. COLEMAN, Patent Lawyer
644 G Street, N. W., Washington, D. C.

MISCELLANEOUS

FOR SALE

One new, Model W., Cleveland Tractor and one new, Double Gang, Oliver Tractor Plow. Both Plow and Tractor priced to sell at \$800

The Keith & Keith Motor Car Co.
Maysville, Ky.

FOR SALE—Patent, of Automobile, starting, testing and running-in machine, used in starting automobiles through the rear wheels, enables you to run in new pistons or bearings without removing motor. Detects knocks or any trouble in motor, transmission or differential; tests electrical equipment, generators, magnetos, etc. This machine takes all makes of cars and trucks, both 56 and 60 inch tread up to six inch tires. It is so constructed, it will last a life time. For further information, write G. A. MARTIN, 507 N. Cedar St., Greensboro, N. C.

FOR SALE—ESSEX RACE CAR BARGAIN. Tiptop racing condition. Speedy. Won \$2500 last season. Built for dirt track at cost of \$3000. Spare motor assembly including clutch, transmission and many other spare parts go with it. 30 x 3 3/4" R-W straight side wire wheels. High tension mag., Miller carburetor, special narrow brass radiator, special cam shaft, outside exhaust, etc. All for \$500. Wonderful bargain. CALLUM & KLINE, Inc., Norfolk, Va.

BULBS—Save money on automobile bulbs. 40 per cent off standard list in lots less than 100. 40 per cent and 10 per cent in lots of 100 to 200. 50 per cent in lots of 200 or over. Our bulbs are guaranteed. Order today, or send for list.

AKELEY-STEEL CO., AURORA, ILL.

FOR SALE—VULCANIZING PLANT. Complete Akron-Williams Vulcanizer. Brand new. Has never been uncrated. Equipment includes Air Tank, Compressor and complete set of tools. Cost \$1278.00. For quick sale will sell for \$795.00. WALRAVEN'S GARAGE, Malta, Ohio.

FOR SALE
Garage repair shop doing good profitable business. Bad health necessitates quick sale.
Stanley Kadla, Birsay, Sask., Canada.

FOR SALE
CYLINDER GRINDER lathe attachment. Good as new. MacVicar Machine Shop, 214 Milton Ave., Syracuse, N. Y.

HELP WANTED

SALESMEN WANTED—Manufacturer of Tire-Covers, Seat Covers and Top Recoverers wants salesmen who will call on retail trade East of Mississippi River. Liberal commission. State experience and territory wanted. Address Box 6115, care MOTOR AGE, 5 So. Wabash Ave., Chicago, Ill.

WANTED: Salesmen or Selling Agencies, also Distributors in all Territory to sell our Mirror Bright Auto Polishes. Absolutely nothing like them. Attractive proposition. Territory going fast. Write us: Southern California Sales Co., Manufacturers, Pasadena, Calif.

Convenient Service for Dealers

There are seventeen Snap-on branches all over the country, each carrying a complete stock of Snap-ons. With a Snap-on Cabinet and a branch nearby, you can handle any socket wrench inquiry quickly and satisfactorily. Write for address of nearest branch.

MOTOR TOOL SPECIALTY CO.

14 E. Jackson Blvd., Chicago

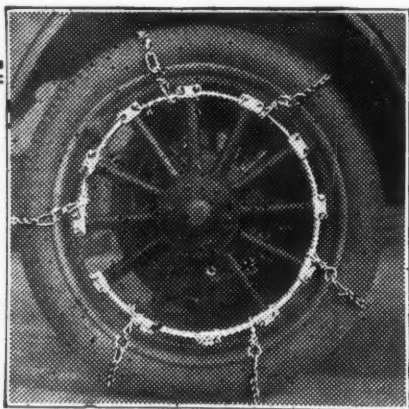
SNAP-ON WRENCH CO., Mfrs.,

Milwaukee

Wisconsin

Snap-on

INTERCHANGEABLE
Socket Wrenches



Travelon For Profits

A good wide margin of profit, often received, is the dealer's who sells Travelon. That's the way to make real money.

There's no kick or come back on Travelon, nor any service problems. It stays sold.

Install it in a few minutes, just by bolting the rings to the spokes. Then the owner snaps on as many chains as he thinks fit. He doesn't get his clothes dirty doing it; he doesn't jack up the car. That is what sells him and brings him back for more business.

The Shaw-Walton Co., Pontiac, Ill.

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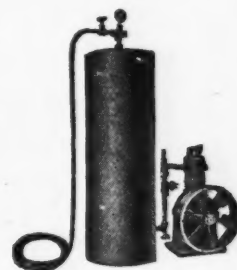


Real Air Service in This Curtis

THE above illustration is the Curtis Style TV Two-stage Outfit—one of the family of popular Curtis Outfits—the last thing in air compressor design—free of complicated parts—built for hard usage and will be on the job all the time. $\frac{1}{4}$ to 3 H.P.—automatic.

Single and Two-stage Many Sizes and Styles

We manufacture a complete line of single and two-stage outfits. You are sure to find one that will meet your particular needs in style, size and price. Write at once for full information and descriptive literature. Use the coupon below, or a postcard will do.



Style "S" Single Stage Outfit. Belted only. Five sizes— $\frac{1}{4}$ to 3 H.P. motor required.

CURTIS PNEUMATIC MACHINERY CO.
1527 Kienlen Ave. St. Louis, Mo.

Branch Office:

530-H Hudson Terminal • New York City

USE THIS



COUPON

CURTIS PNEUMATIC MACHINERY CO.

1527 Kienlen Ave., St. Louis, Mo.

Gentlemen: Please send me full details on Curtis Air Compressors—your proposition and prices.

Name.....

Address.....

Jobber's Name.....

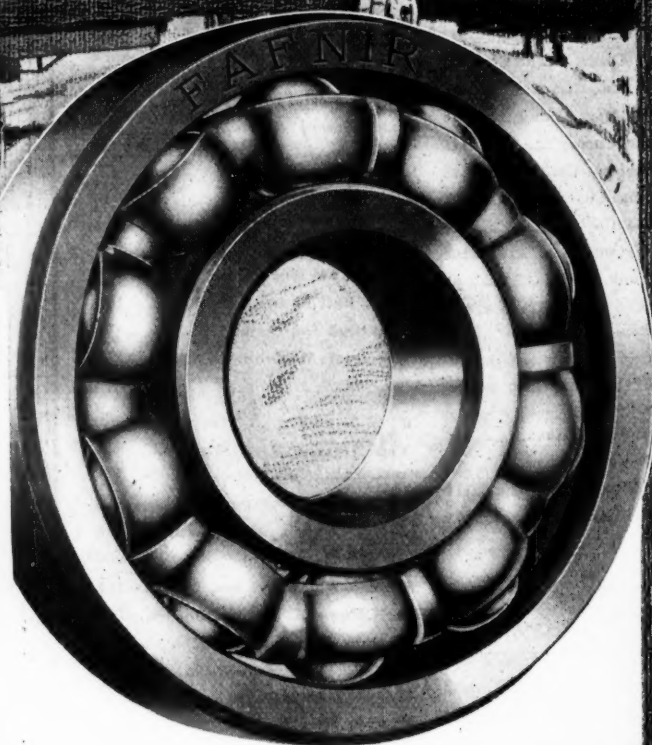
Address.....

FAFNIR



BUILT FOR SERVICE

Fafnir Ball Bearings in all standard types and sizes are built to give maximum service. Fafnir Distributors will fill your requirements promptly.



THE FAFNIR BEARING COMPANY

New Britain, Conn.

CHICAGO, ILL.

537 South Dearborn St.

DETROIT, MICH.

120 Madison Ave., Room 511

CLEVELAND, OHIO.

1016-1017 Sweetland Bldg.

NEW YORK, N. Y.

5 Columbus Circle

NEWARK, N. J.

271 Central Ave.

PHILADELPHIA, PA.

1427 Fairmont Ave.



Makes a quick getaway!

When your Ford customers "step on the gas" they want action.

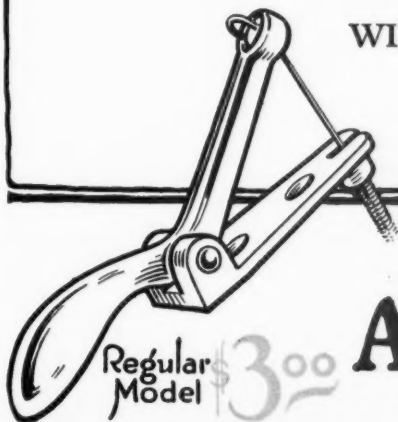
If you sell them Williams Accelerators, they'll get direct action, "quick as lightnin'!"

Because, the *exclusive and patented* Williams flexible control is built for action, from the comfortable pedal design to the troubleproof carburetor connection.

No air tubes or bulbs to wear out or leak. No springs connected in a hit or miss manner to Ford engine or frame. No levers, ball and socket joints or in-the-way mechanism.

Works independently of hand throttle. Built in two models—Regular at \$3.00—Junior at \$1.50. Both models make "a quick getaway" from your shelves. Order your service stock from your jobber today.

WILLIAMS BROS. AIRCRAFT CORP.
25th and POTRERO AVENUE
SAN FRANCISCO, CAL.



Regular
Model

\$3.00

**WILLIAMS
ACCELERATOR**
for FORD CARS



Junior
Model

\$1.50



One of this year's posters

EDISON MAZDA Auto Lamp posters will cover the country during this year's automobile season.

The picture above shows one of the poster designs, but it cannot do justice to the many-colored originals which are extraordinarily strong and effective advertisements and which will *make you feel the demand* for Edison MAZDA Auto Lamps; if you have foresight you will be prepared to supply this demand.

This extensive posting all over the country is just one of the many ways that are available to help you sell Edison MAZDA Auto Lamps. Ask your jobber about the other ones—or write to Edison Lamp Works of General Electric Company, Harrison, N. J.

